29-7-26
NATIONAL MUSEUM MELBOURNE

Vol. XXIV. Part 7.

[Registered at the General Post Office, Melbourne, for transmission by Post as a Newspaper.]

# The Journal of the Department of Agriculture of Victoria, Australia.

July, 1926.

## PRINCIPAL CONTENTS

Pasture Top-Dressing

The Pig Industry

Winter Care and Shelter of Farm Animals

Prune and Plum Culture

Native Insect Pests of the Orchard and Garden

Various Experiments with Wheat, &c.

PRICE THREEPENCE. (Annual Subscription—Victoria, Interstate, and N.Z., 3/-; British and Foreign, 5/-.)

# FARMERS!

**SUCCESS IS CERTAIN**
IF YOU SOW
**THE BEST SEEDS!!**

Purchase your

# GIANT COLONIAL COWGRASS

**From BRUNNINGS——**
**The Original Introducers**

**And be certain of securing the Genuine New Zealand-Grown Strain.** The cost of the very best seeds is small compared to the value of the resultant crop, and the wise farmer knows the folly of risking seeds of doubtful pedigree.

**Giant Colonial Cowgrass yields up to Three Cuttings or Four Grazings in the One Season,** and is highly palatable and nutritious to sheep, horses, dairy cows, and cattle.

# GRASSES and CLOVER

**For Permanent Pasture**

Perennial Ryegrass, Italian Ryegrass, Cocksfoot, Paspalum, Timothy, Prairie Grass, Fescues, Creeping Bent, Crested Dogstail, Subterranean Clover, Cluster Clover, Couch Grass, Sweet or Bokhara Clover, "Tarwel" Strawberry Clover, Cowgrass, Red Clover, Alsike Clover, White Dutch Clover, Trefoil, Suckling Clover.

*Quotations and Special Leaflets Post Free*

# BRUNNINGS

(F. H. Brunning Pty. Ltd.),
64 Elizabeth Street,
MELBOURNE.

# THE JOURNAL

OF

# THE DEPARTMENT OF AGRICULTURE,

VICTORIA, AUSTRALIA.


NATIONAL MUSEUM OF MELBOURNE

## CONTENTS.—JULY, 1926.


| | | PAGE |
|---|---|---|
| Pasture Top-Dressing | *H. A. Mullett, B.Ag.Sc.* | 385 |
| The Pig Industry | *R. T. Archer and A. J. Gill* | 390 |
| Winter Care and Shelter of Farm Animals | *J. M. Kerr* | 405 |
| Various Experiments with Wheat, &c.—Salisbury, 1925–26 | | 411 |
| Murrayville Crop and Fallow Competition | *J. Brake, B.Ag.Sc.* | 415 |
| Daylesford Potato Field Crop Competition | *J. T. Ramsay* | 420 |
| Native Insect Pests of the Orchard and Garden | *C. French, jun. and G. T. Levick, B.Ag.Sc.* | 423 |
| Prune and Plum Culture | *J. M. Ward* | 432 |
| The Horn-Tails—a Timber Pest | *G. T. Levick, B.Ag.Sc.* | 436 |
| Maize Experiments | | 439 |
| The Broom Fibre Industry | | 441 |
| Profit in Milk Production | | 443 |
| Orchard and Garden Notes | *E. E. Pescott, F.L.S.* | 444 |
| Reminders for August | | 447 |



## COPYRIGHT PROVISIONS AND SUBSCRIPTION RATES.

The Articles in the Journal of the Department of Agriculture of Victoria are protected by the provisions of the Copyright Act. Proprietors of newspapers wishing to republish any matter are at liberty to do so, *provided the Journal and author are both acknowledged.*



The Journal is issued monthly. The subscription, which is payable in advance and includes postage, is 3s. per annum for the Commonwealth and New Zealand, and 5s. for the United Kingdom and Foreign Countries. Single copy, Threepence.

Subscriptions should be forwarded to the Director of Agriculture, Melbourne. A complete list of the various publications issued by the Department of Agriculture will be supplied by the latter.

W. & W. 1020.

*For the more efficient working of Country Properties the Gates and Fences for Paddocks or for the Homestead Frontage should be CYCLONE, the Original Make. —— Established over a Quarter of a Century.*

# Cyclone

## METAL GATES

*Cyclone Metal Gates stand the test for Dependability and Durability*

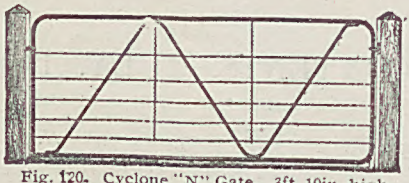


Fig. 120. Cyclone "N" Gate. 3ft. 10in. high. Made to fit openings from 10ft. to 13ft.

*Many Designs are illustrated in the Cyclone Catalogue* **POST FREE**

**Cyclone Fence & Gate Co. Pty. Ltd.**

**189-191 William Street, MELBOURNE. 'Phone: Central 3228**

*Also at Commerce Building, Ash St., Sydney, and Exchange Buildings, Pirie St., Adelaide*

# ALSTON

## WINDMILLS

**FOR ALL WATER SUPPLIES**

Their Reliability is Proverbial.

Fitted with Machine-cut Gears, Ball Bearings, Auto Lubrication, and Storm-Proof Regulators. All working Parts Enclosed in a Dust-Proof Case and run in oil.

If unable to procure locally write us direct.

*James Alston & Sons Pty. Ltd.*
Queen's Bridge
Melbourne

OVER 50,000 ALSTON MILLS IN USE. EXPERT ADVICE & 70 PAGE CATALOGUE FREE ON APPLICATION

# TROUGHING

For Watering or Feeding Sheep, Cattle, Horses, Calves and Pigs

ALL SIZES AND ALL LENGTHS

## ALSTON'S Patent

Steel throughout. Put together with a wrench, no solder required. Cannot leak or pull apart, because the Alston Patent Coupling makes a perfectly watertight joint without grooves to fracture the galvanising while locking every section together as rigidly as a bridge.

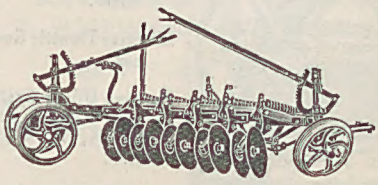
The heavy Steel Angle Frame and heavily Galvanised Steel Sheets used, together with our patent coupling, are points which make the ALSTON TROUGHING superior to all others.

*Send for illustrated leaflet.*

**JAMES ALSTON & SONS PTY. LTD.**
**QUEEN'S BRIDGE, MELBOURNE**

# Sunshine Farm Implements work well and last long

## PRICES ARE LOWEST *but* VALUE HIGHEST

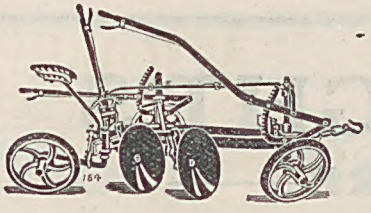


### "SUNDERCUT"

**10 disc, cuts 5 ft.; 14 disc, cuts 7 ft.**

**For Summer fallowing in hard soil.**

For ploughing stubble, and killing and burying the heaviest weed growths. More "SUNDERCUTS" are at work in Australia than any other Stump Jump Disc, because they shift more soil per horse power than any other.

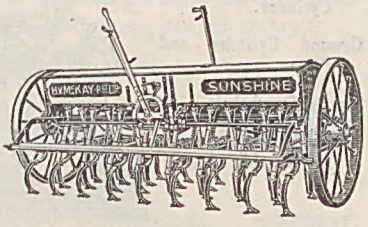


### "SUNNIE" LIGHT DISC PLOUGH

| | | |
|---|---|---|
| 1 furrow .. .. | £18 | 0 0 |
| 2 furrow .. .. | £22 | 10 0 |
| 3 furrow .. .. | £27 | 0 0 |
| 4 furrow .. .. | £33 | 10 0 |

Thousands in use. Light Draught. Easily handled. A favorite throughout the Southern districts of Victoria.

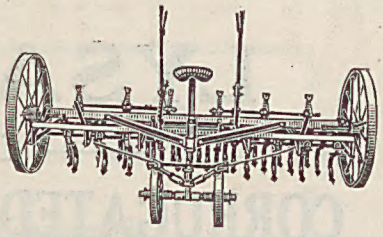
*Heavy Disc Ploughs, also Stump Jump Disc Ploughs, quoted on request.*




### "SUNTYNE"

| | |
|---|---|
| Sizes .. | 8, 12, 14, 16, 20 rows |
| With .. | 17, 25, 29, 33, 41 tynes |
| Width .. | 5, 7½, 8½, 9½, 12 feet |

Combines the best Tyne Cultivator with the best Grain and Fertilizer Drill. Two implements in one. Saves Capital, Saves Labour. Sows scientifically and pays for itself by conserving the moisture and increasing the yield.



### SUNSHINE HIGH WHEEL SPRING TYNE CULTIVATOR

| | | |
|---|---|---|
| 15 tyne, cuts 5 ft. .. .. | £22 | 0 0 |
| 20 tyne, cuts 6½ ft. .. .. | £26 | 0 0 |
| 25 tyne, cuts 8½ ft. .. .. | £31 | 0 0 |
| 30 tyne, cuts 10 ft. .. .. | £36 | 0 0 |
| 35 tyne, cuts 11½ ft. .. .. | £41 | 0 0 |

**Needed on every farm for weeding and fallow stirring.**

**Delivery on rails, Sunshine. Discount for cash, 5%; or easy extended terms.**

*ASK FOR CATALOGUE AND PRICE LIST OF ALL SUNSHINE IMPLEMENTS.*

# H. V. McKAY PTY. LTD.

*Sunshine Harvester Works, Sunshine*

Showrooms - - 664 Bourke Street, near Spencer Street, Melbourne

# MASSEY-HARRIS

**Petrol or Kerosene Engines give dependable power at exceptionally low cost**

***Simple in design* ——— *Easy to operate***

In the making of the Massey-Harris Engine the same practice as is followed in Automobile Engine construction is adhered to.

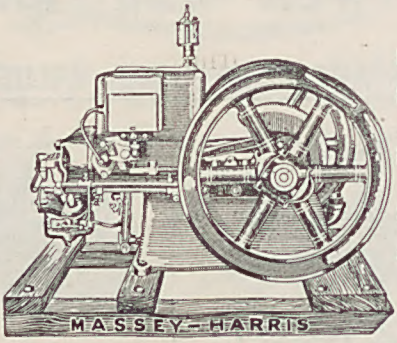
**Every Part Accessible.**

**Valve in Head Type of Cylinder.**

**Ground Cylinder and Piston.**

**Sturdy Crankshaft.**

**Removable Bearings with Replaceable Liners.**




**Split Hub Fly Wheels.**

**Simple and Efficient Mixer.**

**Effective Throttle Governor.**

**Positive Oiling System.**

**Sizes 1½, 3, 4½, 6 H.P.**

*Various size Pulleys available, also Pump Jacks and Transport Trucks. Catalogue, also Prices and Terms, from our Local Agent, or write direct.*

**Massey-Harris Co. Ltd., Melbourne**

**Branches in all States** **Agents Everywhere**

# LYSAGHT'S

## ——— ORB ———

# CORRUGATED ROOFING IRON

**Full supplies throughout Australia are obtainable from all leading Storekeepers and Timber Merchants**

# The "Banyule" Jersey Stud

**HEIDELBERG, VICTORIA ——— 8 miles from G.P.O.**

**ALL GOVERNMENT TESTED**

**YOUNG STOCK FOR SALE**

*Inspection and Correspondence Welcomed.* C. GORDON LYON

TO ATTAIN

# SUCCESS IN DAIRYING

*Keep Good Cows and install efficient, reliable, and labour saving Dairy Machinery.*

THERE IS NOTHING BETTER THAN

## "Baltic" Cream Separators

World-renowned for clean skimming, easy running, and durability.
SEVERAL SIZES TO CHOOSE FROM.
*REASONABLE PRICES. EASY TERMS. 30 DAYS' TRIAL.*

## Sanitary "Simplex" Milking Machines

They embody the very best scientific and successful methods for milking cows.

"CROSSLEY" (English) **Oil Engines** ECONOMICAL. EFFICIENT. Start instantly without trouble.

WRITE FOR FREE ILLUSTRATED CATALOGUE

For Separator Catalogue mention - - No. S 200
For Milking Machine Catalogue mention - No. M 200
For Engine Catalogue mention - - No. E 200

**BALTIC SIMPLEX MACHINERY CO. Pty. Ltd.**
479-481 FLINDERS LANE, MELBOURNE.

# More Nourishing Feed—

RICH in Protein, POLLY DAIRY FEED is more nourishing than bran and pollard.

Animals thrive on it. Cows give greater milk yield when fed on it.

# POLLY DAIRY FEED

**A Pure Product of Maize.**

*Manufactured by*

**MAIZE PRODUCTS PTY. LTD.**
FOOTSCRAY——————VICTORIA

THE

**Farmers & Settlers' Co-Operative Insurance Co.**

OF AUSTRALIA LIMITED

**Farmers and Graziers, Support this Company with all your Insurances, when Dividends and Bonuses to yourselves will be increased considerably.**

Full Particulars from any Agency of the Victorian Producers' Company, 360 COLLINS ST., MELBOURNE.

**SCIENTIFICALLY FITTED GLASSES ENSURE COMFORT**

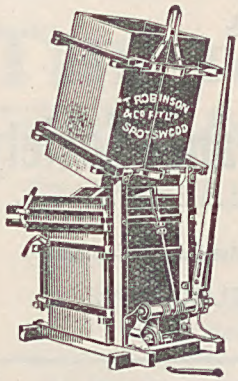
IF you are in doubt as to whether you require glasses or not you should have your eyes tested by an expert. The Optical Service our Clients enjoy ensures comfort in wearing glasses that fit accurately.

**'Phone 6778 for an appointment**

**E. WOOD** PTY. LTD. 95 ELIZABETH STREET — MELBOURNE —

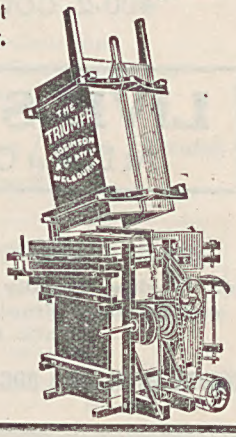
OPHTHALMIC OPTICIANS

*Stevenson*




# WOOL PRESSES

The "FEDERAL" Single Lever Hand Power Tumble Over Box Press will make small and heavy weight bales neatly finished in less than two minutes. Requires small space to operate, Powerful leverage, strongly designed. Price will suit the smallest grower.




The "TRIUMPH" Hand or Engine Power, a high class extremely powerful baler, suitable for large or small flocks, is obtainable with self-releasing Engine Power Attachment, safe and efficient at low cost.

SEND FOR LATEST CATALOGUE AND PRICE LIST

T. ROBINSON & CO. PTY. LTD.
SPOTSWOOD

Showrooms { 536 BOURKE ST., MELB'NE
BURWOOD, near SYDNEY, N.S.W.

# PARSONS BROS. & CO.

Propy. Ltd.

OATMEAL, SPLIT PEAS, and
PEARL BARLEY MILLERS
and "CORNINA" MANUFACTURERS

ARE

# BUYERS of OATS, PEAS, BARLEY, and MAIZE.

SEND SAMPLES OF YOUR GRAIN TO US.

BOX 2514.
G.P.O., MELBOURNE.

'PHONE 7419 CENTRAL

.. THE ..

# Australasian Mutual Insurance Society

LIMITED

(Now Incorporated in the Australian Alliance Assurance Company.)

400-2 COLLINS STREET, MELBOURNE

## LIVE STOCK INSURED

At Lowest Current Rates obtainable in Australia.

OTHER DEPARTMENTS OF BUSINESS

**Fire, Marine, Fidelity Guarantee, Plate Glass, Personal Accident and Sickness, Employers' Liability, Workmen's Compensation, Public Risk, Motor Car, and Burglary.**

INSURE WITH THIS SOCIETY, AND RECOMMEND IT TO YOUR NEIGHBOURS

## COCKBILL'S
## BONE MEAL for FEEDING

CATTLE, PIGS, and all FARM STOCK

IS A SOURCE OF LIME, PHOSPHATES, AND PROTEIN.

**Most Fodders are deficient in mineral matter——
BONE MEAL will provide the necessary mineral matter.**

COCKBILL'S BONE MEAL is manufactured from clean, fresh bones, steamed and sterilized at a high temperature and pressure, and finely ground to ensure easy digestion. **Price, 16s. per cwt.**

*Sample on request to* **J. COCKBILL,** 407 POST OFFICE PLACE, MELBOURNE.

16 Years Practical Tests

## THOROUGH SPRAYING WITH
## "BLUE BELL"
## Arsenate *of* Lead

(Paste or Powder)

## INSURES CLEAN FRUIT

*Full particulars regarding analysis and prices from*

**F. W. PRELL & CO., 31 Queen Street, Melbourne**

or Local Agent in any fruit-growing district

ESTABLISHED 1878

# THE Trustees Executors & Agency Co. Ltd.

OF 412 COLLINS STREET, MELBOURNE

**Directors:**

SIR JOHN GRICE, Chairman.
SIR J. H. MACFARLAND, M.A., LL.D., Vice-Chairman.
HARRY EMMERTON R. O. BLACKWOOD D. STUART MURRAY
ALEXANDER STEWART

*Authorized by Special Acts of Parliament to act as Trustee, Executor, Administrator, and in other trust capacities.*

**The Company has specialized in the management of farms and station properties**

Please call or write for explanatory booklet.

JAS. BORROWMAN
General Manager.

C. R. SMIBERT,
Manager.

# Molasses (Pure Sugar Cane Molasses Try a 42-gallon barrel at 50/-) Molasses

*All stock need Molasses to keep them fit*

Try our

## "Q.M.C. MOLLERNE"

*The Ideal Food for all classes of stock*

**Absolutely the Perfect Winter Fodder!**

Packed in 100-lb. bran bags, 20 bags to the ton, ready for use.

LET US SEND YOU A TRIAL TON AT £8

*Samples and particulars with pleasure, from the manufacturers—*

QUEENSLAND MOLASSES CO. 363 FLINDERS STREET *'Phone 4528* MELBOURNE

DEPARTMENT OF AGRICULTURE, VICTORIA

NOW AVAILABLE

## Handbook of Potato Diseases in Australia—and their Treatment

BY D. McALPINE,
GOVERNMENT VEGETABLE PATHOLOGIST

With Appendices by W. Laidlaw, B.Sc. (Biologist), on **Eel Worms;** and C. French, Jnr. (Government Entomologist), on **Insect Pests of the Potato.**

235 Pages (Cloth). 176 Illustrations. 58 Full Plates. **Price, 5/-** Postage: Commonwealth, 2d.; New Zealand, 8d.; British and Foreign, 1/4.

Applications accompanied by Postal Note or Cheque, covering Price and Postage, to be forwarded to **The Director of Agriculture, Melbourne, Victoria.** Remittances from beyond the Commonwealth to be made by Post Office Order.

# NATIONAL TRUSTEES

## Executors & Agency Company of Australasia Ltd.

*DIRECTORS:*

EDWARD FITZGERALD, Esq., LL.D., Chairman.
HENRY MADDEN, Esq. SENATOR BRIGADIER-GENERAL H. E. ELLIOTT, C.B., C.M.G., D.S.O., D.C.M.
JOHN I. WINTER-IRVING, Esq. CHAS. R. MURPHY, Esq.
JOHN SYLVESTER FEEHAN, Esq.

**This Company Acts as Executor or Joint Executor of Wills, Administrator, Trustee of Settlements, and Agent for Absentees under Power of Attorney.**

MONEY TO LEND ON BROAD ACRES AND FARM LANDS

**Offices—113 Queen St. (Corner of Little Collins-st.), Melbourne**

*J. H. MACOBOY, Manager.*

Is a simple arrangement that multiplies the power at the handle 260 times—handy to use, easy to move, quickly rigged, and works in roughest country. Standard equipment pulls trees and stumps from 1½ acres without changing anchor. Many other time and labour saving features. Catalogue with pleasure.

**TREWHELLA BROS. Pty. Ltd., TRENTHAM**

REGISTERED TRADE MARK

*Works—*
**CURDIE'S RIVER**

Telephone—Central 2807

## "BULLDOG" Unburnt (Ground Carbonate) Agricultural Lime

For Orchards, Crops, and Pastures

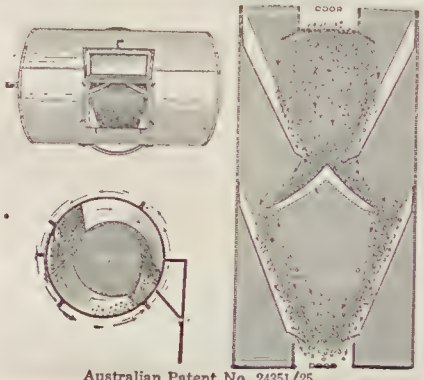
Its use is strongly recommended by all experts, and those who have had practical experience. Any quantity supplied at shortest notice.

*For applying to land we recommend our "Ajax" Lime Spreader*

**Have you seen our Reinforced Cement Cattle and Pig Troughs?**

*Rates and full particulars from Distributors—*

**T. CURPHEY Pty. Ltd.** 225 Coppin St. Richmond, Victoria



Australian Patent No. 24351/25.

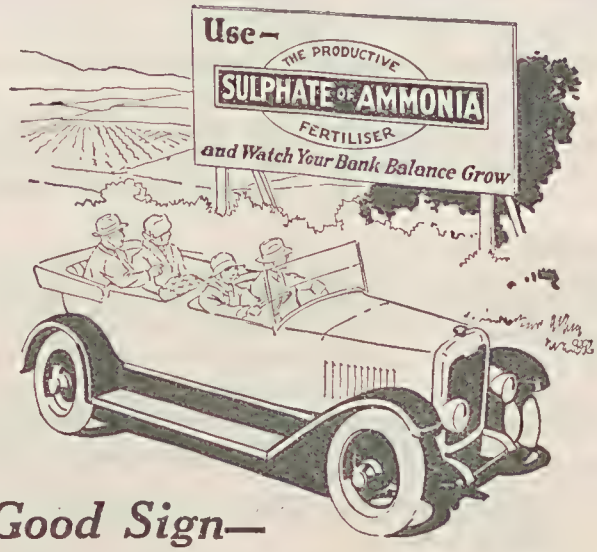
## The "Hudson" Patent Dry Wheat Pickler

**Capacity 8 to 10 Bags per Hour.**

THE "Hudson" Patent Dry Wheat Pickler is the simplest wheat pickler yet invented. It has no mechanical parts to get out of order, is thoroughly dust proof in operation, easily worked, effectively and economically dusts the wheat in the uniform way.

**Price £4/10/-, complete with Brackets**

**Hudson's Stores, 230 King St., Melb.**




*A Good Sign—*

It is a good sign when so many farmers and orchardists show their appreciation of the merits of

# SULPHATE OF AMMONIA

For such a sign makes us aware of the progressiveness of the Australian agriculturist, of his readiness to utilise a known means of increasing his bank balance through higher yields at lowered costs, and of his faith in an Australian product. During the last five years the Australian consumption of Sulphate of Ammonia has more than doubled

* * *

*Write for free Sulphate of Ammonia literature to*

**The Australian Sulphate of Ammonia Propaganda Committee**

360 COLLINS STREET, MELBOURNE.

DEPARTMENT OF AGRICULTURE, VICTORIA

# Red Poll Dairy Herd

**The Department has now completed the orders for calves that were booked ahead of calving when the advertisement was withdrawn; consequently the booking of orders for bull calves from the forthcoming calvings has now been resumed.**

BULL CALVES are sold for delivery at a month old at prices based approximately on the actual milk and butter fat record of the dam at the rate of 1s. per lb. of butter *fat* yielded. Thus a calf from a cow with a 400 lb. butter fat record is sold for 20 guineas, one from a 300 lb. butter fat cow for 15 guineas, and so on. Bull Calves *ex* heifers on their first calf are sold for a set price of 10 guineas.

*(For Record of Yields of dams see Red Poll Herd Book.)*

## SIRES IN USE:

### VICTORIA VOLCANO (322 A.)

Sire: Nicotine (69 A.A.) by Acton Dewstone (imp.) 9524 (4 A.A.).
Dam: Tonga (253 A.) by Honingham Archbishop (imp.) 9702 (48 A.A.).

Tonga's butter fat yields for 6 successive lactation periods are as follow:—1916, 341 lb.; 1917, 398 lb.; 1918, 419 lb.; 1919, 479 lb.; 1920, 428 lb.; 1921, 362 lb.

### BELLIGERENT (Imported) 11096 (8 A.A.)

Dam's Record (1st milking) 7144 lb. milk.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Dam's Dam's | ,, | 14533 lb. milk | ... | 4 years average | | | 12871 lb. milk. | |
| Sire's Dam's | ,, | 10370 | ,, | ... | 7 | ,, | ,, | 9354 | ,, |
| Sire's D. Dam's | ,, | 9510 | ,, | ... | 12 | ,, | ,, | 8033 | ,, |
| G. Sire's D. Dam's | ,, | 10215 | ,, | ... | 7 | ,, | ,, | 9386 | ,, |
| G.G. Sire's D. Dam's | ,, | 12565 | ,, | ... | 10 | ,, | ,, | 8853 | ,, |
| G.G.G. Sire's D. Dam's | ,, | 10088 | ,, | ... | 2 | ,, | ,, | 9754 | ,, |

### BIT O' 'BACCA (Vol. 3)

Sire: Nicotine (69 A.A.) by Acton Dewstone (imp.) 9524 (4 A.A.).
Dam: Nictitana (311 B.) by Nicotine (69 A.A.).

Nictitana's butter fat records for 6 successive lactation periods are as follow:—1918, 450 lb.; 1919, 396 lb.; 1920, 393 lb.; 1921, 465 lb.; 1922, 524 lb.; 1923, 536 lb.

**Inspection of the Herd is Invited.**

***Visitors will be met at the Station on notifying the Manager, State Research Farm, Werribee.***

**Application for purchase to**

**Dr. S. S. CAMERON, DIRECTOR OF AGRICULTURE, MELBOURNE.**

# The Improved Ford Touring Car

Complete with Electric Lighting and Starting Equipment **£179** F.O.B. Ford Works in this State.

## —many important changes

**An Improved Touring Car is announced, embodying outstanding achievements in Beauty of Design, Quality of Construction, and Completeness of Equipment.**

New Streamline Design.
Longer and Lower-hung Body.
Whole Chassis Lowered.
Re-designed Black Hood.
New Side Curtains which open with doors.
Double Ventilating Windscreen.
Lower Seats and More Leg Room.
New Type Spare Tyre Carrier.
Larger and More Shapely Crown Type Mud Guards.
Tail Light and Number Plate Bracket now in One Unit.
Dash Light on Re-designed Instrument Board.
Windscreen Wiper and Rear-Vision Mirror.
Nickelled Radiator Shell and Head Lamp Rims
New Type Clutch and Brake Pedals.
Hardwood Floor Boards, Reinforced by Pressed Steel around Pedal Slot.
8-Gallon Petrol Tank, now under the Cowl.
New Deflector Plate directs Engine Heat away from Driver's Feet.
Improvement to Fan and Fan Assembly.
New Type Combined Petrol Choke and Adjuster, now located on Instrument Board.
Compartments for Tools, &c., under both Front and Rear Seats.
Transmission Bands now Removable through Transmission Inspection Plate.
Electric Wiring Simplified, due to New Convenient Location of Coil Box and Terminal Block.
Bonnet is Larger, with Added Louvres.
Sediment Bulb and Ignition Coils accessible for Adjustment by simply raising Bonnet.
Brake Shoes on Rear Wheels now Raybestos-lined. Diameter increased by 3 inches and width by ½ inch.
Width of Transmission Brake Bands increased to 1¾ inches.
Brake Surface Increased by 32%.
Improved Type Transmission Cover now Surfaced and Solidly Fixed to Cylinder Block.
Extra Braces from each Side of Cylinder Block to Crank Case, to Prevent Vibration and Engine Torque.
Reduction through Altered Steering Gear Mechanism increased from 4 to 1 to 5 to 1.
New Type Crank Case Cover permits adjustment of No. 4 Bearings without use of Specially-made Wrenches.
Engine may now be Removed Bodily and with Little Trouble for Bench Test or Overhaul.

**See Your Nearest Ford Dealer. Easy Terms arranged under Ford Purchase Plan.**

Ford

FORD MOTOR COMPANY OF AUSTRALIA PTY. LTD BRANCHES IN ALL STATES.

THE Commonwealth Bank of Australia is founded on the experience of the whole history of Banking, and its Security is Australia itself, for it is guaranteed by the Government of the Commonwealth of Australia.
The service of the Bank extends through Branches in the principal towns, and there are Savings Bank Agencies in nearly 4,000 Post Offices.
Commonwealth Bank of Australia.
Guaranteed by the Commonwealth Government
Head Office Martin Place.
SYDNEY.

AUSTRALIAN MADE WIRE NETTING PROOF SYDNEY, N.S.W.

TRADE MARK

LYSAGHT'S Australian Made

*QUALITY GUARANTEED*

WIRE NETTING

FENCING WIRE and other WIRE

ZINC OXIDE

*Obtainable from all the Leading Merchants and Storekeepers*

LYSAGHT BROS. & CO. LTD.

Manufacturers ——— SYDNEY

Victorian Agents—Gibbs, Bright & Co., 34 Queen St., Melbourne

# This Journal

offers exceptional advantages

# for Advertising

Circulates throughout the **Country Districts of Victoria** and amongst **Farmers of the Commonwealth**, reaching also country professional men, tradesmen, schoolmasters, teachers, and the like.

Exceptionally satisfactory results have followed the advertising of Stud Stock in this Journal.

*Rates on application to the Official Canvasser*

**Mrs. Hemming, 26 Sutherland Rd., Armadale**

**GRAZIERS !!! — *You are recommended to try***

# CUMING SMITH'S

**ARSENICAL POWDER**

# SHEEP DIP

**(20 % Arsenic Trioxide)**

*For Dipping Sheep and Lambs*

Wets Easily and Mixes Without Delay, and is thus Prepared Ready for making up and Dipping Immediately. Saves you both time and expense

*Put up in Cases each containing ten 10 lb. Packets, with full directions on each.*

This Dip—while mixing readily and therefore being convenient to use—is not all immediately soluble, but only partly so, providing arsenical sulphur compounds partly in a quick acting form to be of immediate effect in destroying vermin, and the remainder decomposing gradually to provide for later on in the season, thus giving protection to the sheep for the maximum period possible with powder dips.

NOTE.—With this Powder prepared for the purpose, finished dip can be made up from the dry powder on the same day, there being no necessity to soak one day and dilute the next, as commonly practised.

*Further information on application to Agents or to the Manufacturers,*

**CUMING, SMITH & CO. Pty. Ltd.** HEAD OFFICE: 65 William St., MELBOURNE

# POWER FARMING CUP

## WON BY

# McCORMICK-DEERING TRACTOR OWNER

THE greatest crop competition in the history of Australian agriculture has been won by Messrs. Schramm Bros., White's River, South Australia, to whom has been awarded the Power Farming Cup donated by the publishers of *"Power Farming in Australia"* for the best crop of wheat put in and taken off with a farm tractor. ¶Messrs. Schramm Bros. used a McCormick-Deering Tractor throughout the entire operations—plowing, cultivating, planting and harvesting exclusively with this dependable and efficient power plant. ¶Another McCormick-Deering Tractor owned by Mr. Steve Kanaley, Junee, N.S.W., secured second and third prizes, thereby establishing an unassailable record. ¶The cup contains 135 ounces of silver, stands over two feet high, and is worth 100 guineas. It is the largest cup ever spun in Australia and is one of the finest specimens of the silversmith's art this country has ever produced. ¶The competition was followed with intense interest all over Australia and more than five hundred tractor farmers engaged in the contest. ¶The fact that tractors were used by every one of the competitors illustrates the universal use of modern power plants on Australian farms and proves the keenness of the contest through which the McCormick-Deering Tractor emerged with complete triumph. ¶The competition for the Power Farming Cup was judged by the Superintendent of Agriculture in New South Wales whose award is appended.

*Result of Competition for Power Farming Cup*

| NAME OF COMPETITOR | Actual Bushel Weight, Lbs. | Points Bushel Weight, Max. 50 | Points Appearance. Max. 40 | Points for Type. Max. 10 | Points Condition. Max. 40 | Total Number Points Max. 140 | THE AWARD |
|---|---|---|---|---|---|---|---|
| ¶Schramm Bros., White's River, S.A. | 66.75 | 47.7 | 38 | 10 | 38 | 133.7 | 1st Prize |
| ¶Steve Kanaley, Junee, N.S.W. (No. 1 Crop) | 66.25 | 47.3 | 38 | 10 | 38 | 133.3 | 2nd Prize |
| ¶Steve Kanaley, Junee, N.S.W. (No. 2 Crop) | 65.00 | 46.4 | 37 | 10 | 38 | 131.4 | 3rd Prize |

All Three Prize Winners used McCormick-Deering Tractors

INTERNATIONAL HARVESTER COMPANY OF AUSTRALIA PTY. LTD.

278-294 Roma Street BRISBANE — 229-231 Castlereagh Street SYDNEY — 543-555 Bourke Street MELBOURNE — 113-114 North Terrace ADELAIDE

RICHARD PURSER & CO., BASSENDEAN, AGENTS FOR W.A.

THE JOURNAL

OF THE

# Department of Agriculture

OF

VICTORIA.

Vol. XXIV. July, 1926. Part 7.

## PASTURE TOP-DRESSING.

**An Address by H. A. Mullett, B.Ag.Sc., Superintendent of Agriculture, broadcast through 3LO.**

The value of the wealth produced from all sources in Victoria amounts, in round figures, to £100,000,000 sterling annually. To that sum the primary industries contribute £50,000,000, and the secondary industries a like amount. Wheat, the most important cultivated crop, yields about £9,000,000 of wealth annually, but the lowly pasture grasses contribute a far larger sum. On them, sheep, returning about £8,000,000 sterling, and cattle, producing £10,000,000 worth of wealth each year, are almost entirely maintained.

Obviously, then, grass is Victoria's greatest crop, and, therefore, methods of improving its carrying capacity, or, as it has been aptly put, "growing two blades of grass where one grew before," are of first-class importance to the farmer and to the State. Too long—far too long—have most farmers and graziers been content to accept the quantity and the quality of the herbage on their pastures as something entirely beyond their own control. They have relied too hopefully upon the coming of bumper seasons and higher prices to better themselves.

How many millions of money have been lost to the State by adherence to this simple traditional pastoral policy no one knows; but you can guess at it when I tell you that there is no reason whatever why the carrying capacity of about 18,000,000 acres of pastures should not be doubled by methods which have been shown in actual practice to be capable of immense improvement.

There is no fundamental difference between grasses and such cereals as wheat and oats, which are actually grasses. The same principles which give increased yields in a wheat or oat crop will improve the carrying capacity of a pasture. When the dairyman and the grazier treat their pasture with the same care and skill as the Wimmera farmer does his wheat crop, they will obtain similar improvement in yields.

The simplest and most profitable method of increasing the returns from a pasture is by top-dressing it with artificial manure. The areas

which respond best are those in which there is an abundant rainfall. But no hard-and-fast rule can be laid down as to the minimum rainfall required to make the proposition a payable one.

Up to the present, the official experiments have been confined to the moister parts of the State, and they afford abundant evidence that where the annual rainfall is 20 inches and over it pays to top-dress.

When test plots are laid down in the drier parts of the State, it is quite likely that they will demonstrate that top-dressing will be profitable there too, but the meagre rainfall imposes a definite limit to the growth of pasture, no matter how it is assisted artificially. Hence a profit here can be looked for only from comparatively inexpensive doses of manure; either small quantities frequently applied or larger quantities at comparatively wide intervals.

Farmers in the north, whose pasture consists of cultivation paddocks spelled in grass for a couple of years, will find that the most profitable method of growing the maximum quantity of feed is to liberally manure the cultivated crop. They will obtain from the increased yield produced a cash return more than sufficient to liquidate the extra cost of the manure, while the residues will exert a markedly beneficial effect on the pasture.

Little was heard of top-dressing in Victoria prior to five or six years ago, but it is no new thing. Its advantages were first demonstrated by Lawes at the Rothamsted Experiment Station in England nearly three-quarters of a century ago! Since that time the practice has been closely investigated in all parts of the world, and is routine on most up-to-date farms in other countries. It is a striking commentary on our boasted capacity for enterprise that we should have neglected such a profitable agricultural practice for so long. At Rothamsted, a comprehensive range of fertilizers has been applied to certain pasture fields annually for 70 years. The weight of grass, hay, and data relating to the type of herbage growing has been obtained from each field annually throughout all that time. The effect of this work has been to establish certain fundamental top-dressing principles which have been since demonstrated to apply the world over. Broadly speaking, top-dressing with most fertilizers produces—

1. An increased weight of pasture.
2. A change in the kinds of plants growing in the pasture.
3. Alterations in the chemical composition of the pasture.
4. Increased palatability.

These facts may be illustrated by reference to data obtained from experiments conducted in this State by the Department of Agriculture during the past fifteen years. The tests show that here superphosphate is the predominant fertilizer, just as it is with cereal crops. So far as the tests go, they indicate that no other fertilizer applied by itself gives results as payable as superphosphate. Lime gives no increase whatever when applied by itself, but if used in conjunction with superphosphate is generally beneficial. Little or no benefit can be seen from potash fertilizers, but in the heavy rainfall districts nitrogen may prove to be useful, though to what degree has yet to be demonstrated.

Though there are exceptions, the effect of an application of superphosphate, say, at the rate of 1 cwt. an acre, is little short of marvellous. The herbage grows more rapidly, the proportion of trefoils and

clovers immediately increases, bare patches between the grass tufts gradually fill up, and, moreover, stock show a strong preference for it. Indeed, when they have access to both top-dressed and untreated pasture they will generally neglect the latter. In places where the soil is very deficient in phosphate of lime, this preference for top-dressed pasture sometimes produces extraordinary effects. A few years ago, Mr. Horne, of Cudgee, near Warrnambool, top-dressed a paddock with superphosphate. The lad in charge of the drill was a new chum, and drove it "wheel to wheel," thereby leaving untreated strips 14 inches wide at intervals of 10 feet or so throughout the paddock. The dairy cattle entirely neglected the untreated strips, so that as the season advanced the grass appeared to be growing tallest there. I saw this paddock in the following March, when the pasture had dried off. The grass in the strips was about 18 inches high, and the cattle had allowed it to go to seed, whereas elsewhere it had been cropped as closely as a lawn. Since then numerous similar instances have come under notice.

The strong preference shown by the animals for top-dressed pasture is evidently due to the higher food-content, especially phosphate of lime. Most of our soils are lacking in this element, some very much so. The soil deficiency may result in the pasture containing insufficient of these minerals to supply the needs of the animals, whose growth and production are dependent, not so much on the bulk and weight of the food they eat, but on its composition. Young, growing cattle require substantial quantities of phosphate of lime to build their bones and body tissue; and, if the pasture contains insufficient, their growth is slowed, and in extreme cases the bones themselves are imperfect.

Dairy cows require liberal supplies of phosphate of lime for milk production. Every gallon of milk a cow produces contains the equivalent of 1¼ oz. of phosphoric acid. Thus a cow yielding 500 gallons of milk in a year gives out the equivalent of 625 oz. of phosphoric acid, which is the amount contained in about 200 lb. weight of superphosphate. If the animal is unable to get sufficient minerals in the grass, the instinct of motherhood is so strong that for a time she will make up the deficiency by drawing on her own bones for the deficiency; actually lightening them by a measurable amount. She will seek phosphates by chewing bones, bark, and even offal, thereby rendering herself liable to certain bacterial diseases. Later on, of course, she will limit the milk supply, even though there is apparently plenty of lush pasture.

The continual drain that milking cattle and young animals make on the soil is not without its effect on the pastures. Thousands of acres in Gippsland which once grew excellent English grasses and clovers are slowly reverting to native grass, flat weeds, dandelions, and bracken. Each year the introduced grasses get less and less in numbers. The cause is traceable directly to loss of minerals. The better grasses, and especially the clovers, require soils well stocked in available plant food. These conditions existed for some years after the original timber and scrub were burned, because the ashes were returned to the soil. Gradually, however, the essential minerals are being "milked" out of the soil.

Consider a particular patch where, say, two plants of cocksfoot were growing. At length there comes a time when there is only sufficient phosphate in that spot to maintain one plant. The weaker one

goes to the wall, and a bare patch is left, which is filled by some plant better able to thrive in the poor soil. In wet patches it may be a worthless moss, elsewhere it may be a flat weed, or some other weed of deep tap-rooting habit, or of low phosphoric acid requirement, such as bracken fern.

You may well ask why are plants with deep tap-roots able to thrive in these partly exhausted soils, and the answer is that the deep tap-roots enable them to obtain their food from a layer of soil below that impoverished by the grasses. In pastures which have never been sown down, the decline in fertility can be noticed by the increasing tuftiness of the pasture, and the more extensive occurrence of bare patches between the tufts. Of course, grown cattle not in milk and sheep make little drain on the soil minerals; that is why sheep are able to do so well on pastures upon which it would be impossible to dairy.

Nevertheless, there are extensive areas of merino country in Victoria, particularly in the Western District, where sheep cannot rear lambs well on the native pasture, though dry sheep thrive excellently there. Again, the cause of this is phosphate deficiency in the pasture. All this area can be rendered suitable for breeding ewes by top-dressing it with superphosphate.

When settlers on the Moralla Estate, near Hamilton, took over their blocks some years ago, they found that they could not breed sheep successfully. Later on, after cropping the land and manuring it for a year or two, the carrying capacity of the pasture was practically doubled, and not only could lambs be reared successfully, but they could be fattened.

Averaging the results of the departmental experiments and those conducted under the auspices of the Chamber of Agriculture, an application of superphosphate at the rate of 1 cwt. to the acre increases the yield of grass by about 50 per cent., while 2 cwt. gives an increase of about 100 per cent. during the year of the application.

At Hamilton and Rutherglen, and in a number of other centres, increases of 300 per cent. have been obtained from the use of 2 cwt. of manure; but in some places, for instance, at Werribee, the returns have been less than 50 per cent.

In the tests quoted the yields are for dried grass hay cut from representative parts of the plots at the time of maximum growth, i.e., in the late spring. A much more reliable measure of increased carrying capacity is to graze animals on plots, both manured and unmanured. This has been done with sheep on the farm of Mr. H. A. Lumb, at Bannockburn, near Geelong. The work is done under Government supervision. In 1924, 5 acres of virgin pasture on light sandy soil, freshly cleared of timber, were top-dressed with superphosphate at the rate of 1 cwt. an acre. On this paddock ten dry sheep were placed. In an adjoining field of 5 acres, identical except that it was not top-dressed, five dry sheep were placed. The sheep were weighed monthly, and each lot was found to make a gain in weight during the year sufficient to show that each enclosure was stocked to its full capacity. In all, the ten sheep on the manured 5 acres gained 90 lb. more weight than those on the unmanured area, and they cut 96 lb. of wool, as against 49 lb. Calculated as a wool proposition only, the manured land grew $9\frac{2}{5}$ lb. of wool per acre more than the unmanured. Valuing the

wool at the low price of 1s. 6d. a lb., there is a return of 13s. 6d. an acre for an outlay of 6s. an acre, plus, of course, interest on the extra sheep.

But the effect of the superphosphate is by no means exhausted in one year. On this field, in 1925, no further manure was applied, yet it carried two ewes and lambs to the acre for a considerable period.

When superphosphate was first applied to pastures, it was not expected that its effect would last more than a year or two, but careful tests conducted at Hamilton indicate that an application at the rate of 2 cwt. to the acre continued to exert a measurable effect for five years. This should not be taken as implying that the top-dressing should not be repeated more often than that. Indeed, there is plenty of evidence that on some land, particularly on dairy farms, it pays to top-dress every year, and in some instances twice a year.

In other cases, the expenditure of 6s. an acre does not give any more than 6s. worth of extra feed in the first year. Where that is the case, the grazier can expect to recoup himself out of the residual effect. He can reckon on the manure exerting in five years an effect equivalent to about three years equal to the first. That is to say, he gets his net result for 2s. an acre. Considered from this point of view, the top-dressing of some land which at first sight looks a doubtful business proposition is seen to be very profitable.

A first-class pasture should contain clovers and trefoils, as well as grasses. Clovers and trefoils are rich in nitrogen and minerals, and with the grasses they make a properly balanced food for the animal. A good pasture should contain from 25 to 30 per cent. of these plants. Few natural pastures do this except on rich flats. Clovers and trefoils are very sensitive to phosphate deficiency in the soil, and they respond in a marvellous way to applications of superphosphate. For instance, at Hamilton, in 1920, the year 2 cwt. of superphosphate was applied, only 4 per cent. by weight of trefoils was found in the unmanured plot, while in one year this had been increased to 19 per cent. where the superphosphate was applied, and to 28 per cent. where lime was added as well as superphosphate. The tendency for the manure to alter the composition of the pasture should be closely watched. Repeated annual dressings may induce too much trefoil, which is objectionable on first-class dairying country, as it dies off early in the summer. A superabundance of clover can be easily checked by the addition of some nitrogen, say, in the form of ammonium sulphate or nitrate of soda, to the pasture. These fertilizers tend to suppress clovers and to encourage tall-growing grasses; in fact, under various names they are used for clearing golf lawns and bowling greens of clovers.

Similarly, those who wish to grow rye-grass hay should manure it with a mixture such as superphosphate, 2 cwt., and ammonium sulphate, 56 lb., per acre.

I propose now to deal for a few minutes specially with the practical side of top-dressing. The manure which will return the biggest profit for the least outlay is superphosphate. It should be applied in dressings of from 1 to 2 cwt. an acre. The wetter the district and the better the land, the heavier the dressing should be. I would like to lay special stress on the fact that it pays better to top-dress good land than poor land. That is contrary to accepted belief, but it is nevertheless true.

Poor lands and light soils are not fertile enough in other respects to make immediate use of heavy dressings of manure. They are better coaxed along with a few moderate dressings, say, 1 cwt. an acre at a time. On all soils the manure should be applied in the early autumn, when the young seedlings normally germinate. The seedlings require abundant supplies of freely available plant food, which, if present, will greatly alter for the better their subsequent growth.

There is some doubt as to whether it pays better in the wetter parts of Gippsland to apply the manure in the spring instead of autumn. However, a good system is to top-dress some paddocks in autumn and some in spring. On small holdings it sometimes pays to do the whole lot twice a year with 1 cwt. an acre, rather than with 2 cwt. in the autumn.

The manure may be applied by hand, by an old drill, and better still, by special distributors. It is not necessary to stir the soil, though this has a virtue on its own account. No hard and fast rule can be laid down as to when the dose should be repeated. Broadly speaking, dairy farms should be dressed annually; on lighter soils and sheep country less frequent applications may be made.

Each case must be judged on its merits. An application every three years should pay on almost every property south of the Divide.

# THE PIG INDUSTRY.

*By R. T. Archer, Senior Dairy Inspector, and A. J. Gill, Senior Herd Tester.*

## The Possibilities of the Industry in Victoria.

An industry of great possibilities in Victoria, though but little engaged in, is the rearing of pigs. So suitable are our climatic conditions for the work that probably it can be said they are unsurpassed by those of any other country in the world, and in most parts of the State food can be grown cheaply and in large quantities. These advantages must easily outweigh the one drawback—our great distance from an ample market.

It has been proved that we can compete successfully in the London market with butter, and there is every reason to believe that we might do even better with our bacon.

The demand throughout the world for bacon and ham is increasing. Great Britain annually imports pig products to the value of over £60,000,000; therefore, we have in that country alone an almost unlimited market. When we consider that Denmark, very little more than one-sixth the size of Victoria, and importing a large quantity of the necessary concentrates, is drawing over £20,000,000 a year from Great Britain for pig products, we cannot congratulate ourselves on our progress. Why should not ten or even twenty millions of this amount be coming into the pockets of our Victorian farmers is a question we may well ask; but of this we may be sure—we shall not get it if we do not strive for it.

## IMPORTS OF PIG PRODUCTS INTO GREAT BRITAIN.

Hereunder are figures showing the quantities and value of pig products imported by Great Britain during the last few years:—

| Pig Products from— | Quantities, Year Ending 31st December, | | | Value. | | |
|---|---|---|---|---|---|---|
| | 1923. | 1924. | 1925. | 1923. | 1924. | 1925. |
| BACON. | Cwt. | Cwt. | Cwt. | £ | £ | £ |
| Denmark .. | 3,530,561 | 3,987,160 | 3,738,834 | 19,636,164 | 20,314,125 | 22,163,854 |
| United States of America .. | 2,828,662 | 1,833,824 | 1,490,394 | 11,509,263 | 7,164,916 | 7,472,307 |
| Irish Free State .. | 308,269 | 595,409 | 461,548 | 1,661,481 | 3,157,375 | 2,924,601 |
| Canada .. .. | 834,284 | 1,191,044 | 1,266,861 | 3,846,568 | 5,484,194 | 6,843,787 |
| Other Countries .. | 291,374 | 265,940 | 528,983 | 1,525,059 | 1,268,628 | 2,835,268 |
| Total .. | 7,793,150 | 7,873,377 | 7,486,620 | 38,178,535 | 37,388,638 | 42,239,817 |
| HAMS. | | | | | | |
| United States of America .. | 1,620,312 | 1,475,228 | 1,309,687 | 7,744,022 | 6,880,345 | 7,324,953 |
| Canada .. .. | 114,308 | 145,929 | 188,499 | 543,292 | 692,852 | 1,088,227 |
| Other Countries .. | 12,471 | 14,865 | 18,841 | 70,958 | 97,784 | 130,286 |
| Total .. | 1,747,091 | 1,636,022 | 1,517,027 | 8,358,272 | 7,670,981 | 8,543,466 |
| PORK, FRESH. | | | | | | |
| Netherlands .. | 342,385 | 534,743 | 819,843 | 1,801,453 | 2,639,770 | 4,122,182 |
| Irish Free State .. | 232,522 | 248,605 | 179,731 | 996,482 | 1,065,452 | 932,938 |
| Other Countries .. | 38,227 | 24,998 | 13,911 | 193,739 | 135,312 | 67,003 |
| Total .. | 613,134 | 808,346 | 1,013,485 | 2,991,674 | 3,840,534 | 5,122,123 |
| PORK, FROZEN. | | | | | | |
| China .. .. | 7,275 | .. | 19,585 | 25,929 | .. | 75,035 |
| United States of America .. | 291,539 | 169,880 | 129,657 | 1,304,025 | 734,275 | 628,629 |
| Argentine Republic | 28,383 | 1,445 | 6,689 | 102,173 | 4,916 | 32,294 |
| Other Countries .. | 76,268 | 29,216 | 68,824 | 290,671 | 119,687 | 285,627 |
| Total .. | 403,465 | 200,541 | 224,755 | 1,722,798 | 858,878 | 1,021,585 |
| Total Pork—Fresh and Frozen .. | 1,016,599 | 1,008,887 | 1,238,240 | 4,714,472 | 4,699,412 | 6,143,708 |
| SALTED PORK. | | | | | | |
| Denmark .. | 42,023 | 18,461 | 16,313 | 71,969 | 27,352 | 23,586 |
| United States of America .. | 22,034 | 16,316 | 15,732 | 74,083 | 56,038 | 64,348 |
| Other Countries .. | 8,441 | 2,888 | 4,452 | 29,383 | 9,789 | 16,563 |
| Total .. | 72,498 | 37,665 | 36,497 | 175,435 | 93,179 | 104,497 |

IMPORTS OF PIG PRODUCTS INTO GREAT BRITAIN—*continued.*

| Pig Products from— | Quantities, Year Ending 31st December, | | | Value. | | |
|---|---|---|---|---|---|---|
| | 1923. | 1924. | 1925. | 1923. | 1924. | 1925. |
| | cwt. | cwt. | cwt. | £ | £ | £ |
| Total for Bacon, Hams, &c. .. | 72,498 | 37,665 | 36,497 | 175,435 | 93,179 | 104,497 |
| TINNED (including tongues). Not shown separately before .. | .. | .. | 76,688 | .. | .. | 664,542 |
| SWINE, LIVING. | | | | | | |
| For Food—Number | 279,005 | 234,536 | 97,695 | 1,696,930 | 1,170,160 | 618,555 |
| BRISTLES Tons | 2,927 | 3,000 | 2,479 | 1,553,083 | 2,018,281 | 1,744,344 |
| LARD. | | | | | | |
| United States of America Tons | 104,781 | 99,131 | 89,485 | 6,828,488 | 6,989,539 | 7,546,101 |
| Other Countries .. | 16,999 | 25,319 | 24,893 | 1,129,241 | 1,783,215 | 2,010,977 |
| Total .. | 121,780 | 124,450 | 114,378 | 7,957,729 | 8,772,754 | 9,557,078 |
| | .. | .. | .. | 62,634,456 | 61,813,405 | 69,616,007 |

PIG PRODUCTS.—EXPORTS FROM UNITED STATES OF AMERICA, 1924.

| | lb. | £ |
|---|---|---|
| Lard .. .. .. .. .. .. | 944,095,014 .. | 25,145,652 |
| Lard Oil .. .. .. .. .. | 474,823 .. | 11,250 |
| Hams and Shoulders (cured) .. .. .. | 305,109,973 .. | 9,364,065 |
| Bacon (sides) .. .. .. .. .. | 286,627,810 .. | 7,407,090 |
| Wiltshire Sides .. .. .. .. | 18,767,161 .. | 529,695 |
| Cumberland .. .. .. .. .. | 27,474,879 .. | 462,073 |
| Pork (fresh) Carcasses .. .. .. .. | 8,684,854 .. | 215,443 |
| Pork (loins and other fresh pork) .. .. | 24,118,437 .. | 714,944 |
| Pork (pickled) .. .. .. .. | 28,279,903 .. | 670,529 |
| Pork (canned) .. .. .. .. | 3,273,756 .. | 177,324 |
| Swine (number .. .. .. .. | 82,846 .. | 228,612 |
| Total .. .. .. .. .. .. | .. | 44,866,677 |

PIG PRODUCTS.—EXPORTS FROM UNITED STATES OF AMERICA AND GREAT BRITAIN, 1924.

| | lb. | £ |
|---|---|---|
| Ham and Shoulders (cured) .. .. .. | 264,527,977 .. | 8,577,443 |
| Bacon .. .. .. .. .. .. | 178,222,414 .. | 5,351,896 |
| Lard .. .. .. .. .. .. | 225,637,830 .. | 5,596,704 |
| Lard Oil .. .. .. .. .. | 147,107 .. | 3,346 |
| Pork (carcass) .. .. .. .. | 6,617,925 .. | 170,008 |
| Pork (loins and other fresh pork) .. .. | 25,942,204 .. | 856,170 |
| Pork (pickled) .. .. .. .. | 4,519,795 .. | 119,377 |
| Pork (canned) .. .. .. .. | 2,210,316 .. | 145,059 |
| | | 20,820,003 |

Somehow our rural population has been slow to notice the possibilities of the pig industry. In the United States of America, where over 56,000,000 pigs are slaughtered annually, about 6,500,000 are exported. In Canada, Denmark, and Ireland the pig has long been recognized as one of the most profitable of domestic animals, and an important factor in the economical production of food and of wealth.

Most farmers in this country keep a few pigs, but they are generally poor specimens from a mongrel stock, and well accustomed to blows, kicks, and starvation. They are fed on refuse from the house, surplus skim-milk, windfalls from the orchard, or the unmarketable potatoes; in fact, they usually have to play the part of general scavengers. When food is plentiful they fatten, when it is scarce they manage to subsist on what little grass they have access to. Indeed, it is no exaggeration to say that the pig is the most despised and ill-treated animal on the farm.

**Wild Pig captured about 200 miles north of the Murray River by Mr. Reid, of Kerang.**

Slowly, however, the old order is changing, and here and there farmers are realizing that no other animal can show the same profit for the quantity of food consumed. The tours of the Better Farming Train have been instrumental in bringing under notice this long-neglected source of wealth.

## Some Reasons why Pig Rearing is Profitable.

Numerous experiments have proved that a pig requires only half as much food to produce 1 lb. of pork as a steer does to gain 1 lb. in weight, and only two-thirds as much food to yield 1 lb. of pork as is necessary for a sheep to yield 1 lb. of mutton.

Cows drop one calf yearly; a sheep may have two lambs; but in twelve months a sow produces two litters, varying in number from eight to twelve. Another factor in favour of the pig is that it responds

well to good treatment and correct feeding, and can turn a larger variety of foods into money than any other farm animal.

Historians tell us that pigs were kept in England as early as 863 B.C. There is also evidence that the ancient Greeks reared them 3,000 years ago. In several parts of the world pigs exist in a wild state. They are to be found even in some parts of Victoria; these are probably descendants from pigs liberated by the early navigators, or which escaped from settlers.

The original wild pig, of course, differed very much in appearance from the domesticated pig of to-day. In its wild state the pig was heavy in front, with light hindquarters, the strong shoulders well protected by tough skin and thick layers of fat, which gave protection to the part

**Middle York Boar belonging to Mr. C. Edwards, Bacchus Marsh.**
(5 ft. 6 in. in length from butt of tail to between the ears.)

most likely to suffer in combat with his fellows. Our object now is to breed a pig almost the reverse—one with heavy hindquarters, deep long sides, light shoulders, and clean light head. A glance at a shop window where pig products are displayed will reveal the reason for endeavouring to breed pigs conforming to these requirements.

At the time of writing (July, 1926), the following prices are quoted:—

| | Per lb. s. | d. |
|---|---|---|
| Pig cheeks | 0 | 2 |
| Forequarters | 0 | 9 |
| Ham | 1 | 1 |
| Middles | 0 | 11 |

## The Best Breed of Pigs.

The pig that will give the heaviest weight of pork in the right places is the type desired. The question is, What breed is the best, or what breeds should be crossed in order to raise the most profitable pigs? Therefore it is necessary that a farmer commencing pig farming should have a knowledge of the different breeds and their characteristics.

### The Berkshire.

One of the best known pigs in Victoria is the Berkshire, a breed that originated in England. In an old copy of *The Complete Grazier* it is mentioned that some pigs bred by the late Sir William Curtis were exhibited at Lord Somerville's Cattle Show in 1807, and attracted much admiration. "They were," the book says, "of the Berkshire breed, the specific characters of which are a sandy or white colour with

**Large York Boar used on the farm of Mr. Allez, Echuca West.**
(Height at shoulder, 3 ft. ½ in.; length from butt of tail to between the ears, 6 feet.)

brown or black spots, the sides broad, the body thick, close, and well formed, the ears large, and sometimes pendant over the eyes. Another distinctive mark of this breed is that the best of them are without bristles, and the hair long and curly, and curiously feathered about the ears. The skin is thin, the flesh well flavoured, and the bacon of superior quality. The hogs have been reared to the weight of 113 stones of 8 lb."

That is the description of the Berkshire pig 119 years ago. To-day its colour is black, with a touch of white at the end of the tail, about 2 inches of white on each leg, from the toe upwards, a white snout, with the white narrowing to a point between the eyes. There should be no white marks on any other part of the pig. The head should be of medium length, wide between the eyes and ears, snout evenly dished; the ears erect and of medium size, covered with fine silky hair with good fringe. Head and neck should be neatly joined to shoulders, clean and comparatively light; back, long and straight; tail, strong and

well up and level at end of back; ribs well sprung; loins well filled and powerful; sides deep, underline level and not rising at flank nor tucked up at girth. The legs should be strong and straight, not coarse nor too long. The pig should walk on its toes, but not on pasterns. The body should be free from wrinkles and the hams wide, deep, and well fleshed. Any of the following characteristics must be regarded as imperfections:—A totally black face; white spots on body or ears; crooked or inbent knees; coarse mane.

The Berkshire is a hardy pig, and very popular in many parts of the world. For turning the smallest amount of food into the largest amount of gain, the Berkshires excel. They cross well with other breeds. They are good grazers, and the sows make excellent mothers. They are frequently crossed with the Large York or the Tamworth in order to breed a pig that will produce a larger portion of lean flesh, as the pure Berkshire carries too much fat and not enough lean flesh to suit the present taste. They conform more to the lard-bacon type.

### THE MIDDLE YORKSHIRE.

Another breed that enjoys wide popularity is the Middle Yorkshire. This pig is said to be the outcome of a cross between the Large and Small Yorkshire. It is white in colour; the head is moderately short; dished face; snout broad and turned up; wide between eyes; ears fair size and carried erect with fringe of fine hair; shoulders should be free from coarseness; legs straight, set level with outside of body, and showing fine bone; back long and level, wide frame and rump, showing good loin; tail well set up and of moderate length with tassel of fine hair; sides deep with ribs well sprung; belly full but not flabby; straight underline; thick flanks; hams broad, full, and deep. The skin should be free from wrinkles and coated with fine silky hair.

The Middle Yorks are remarkably docile pigs and prolific breeders. They fatten quickly and cross well with other breeds. As is the case with the Berkshire, they carry too much fat for the present-day requirements; consequently, if crossed with leaner breeds, a more profitable pig will be bred.

Defects in the Middle York. are—Black spots on the skin; black hairs; coarse curly hair; narrow heads; crooked legs; coarse heavy shoulders, open on top; drooping quarters; coarse tail; wrinkles on sides; short bodies, and splayed feet.

### THE TAMWORTH.

The Tamworth is another breed well known in Victoria. It originated in England, whence it was brought here some years since. Some writers claim that the Tamworth is one of the oldest known breeds in England, and no other breed appears to have retained the characteristics of the wild pig to such an extent. The colour should be rich sandy or golden, and even. The snout should be long, with a fair width between the eyes; light jowl; neck of fair length; ears upright, slightly inclined forward; sides deep; long fine shoulders, with good girth; good loin, with broad ham; full at the flank; good quality of bone; animal well set up on legs of fair length; the body well covered with straight fine hair. Points objected to are—Black hairs or black patches on the skin; short nose; a head too narrow; narrow sagging back; coarse shoulders; light flanks; narrow hams.

The Tamworth is used for crossing with other pigs of a fattier nature, in order to produce a leaner bacon and pork. In Victoria they are frequently crossed with the Berkshire, and sometimes with the Middle York. They are hardy, excellent foragers and grazers, but are frequently light in the ham and flanks, failing to carry sufficient flesh well down on the ribs and belly.

### The Large Black.

The Large Black is known in Victoria. It belongs, as does the Tamworth, to what may be termed the bacon pigs. It also is of British origin, and is sometimes called the Large British Black. The colour is a uniform slaty black; the snout of medium length. They have fair hams, and attain a great length of body; ears rather large,

**Sows with Litters by Large York Boar (Mr. Thompson's, Pakenham).**

dropping forward; the skin fine and soft, with moderate coat of fine soft hair. When young they tend to grow in height rather than to fatten. The Large Blacks carry a good proportion of lean meat, and are useful to cross with fatter breeds. They are of docile temperament, and make good grazers. Up to the present time not many have been bred in Victoria.

### The Poland China.

The Poland China, a pig of American origin, is not very well known here. This breed is supposed to have been first produced in Ohio from a mixture of Big China, Byfield, and Poland strains. The name was adopted in 1872. Though the colour at first was black and white spotted, the recognized colour now is black with white on the feet, face, and tip of tail. The ears break over into a neat droop, and, as the pig ages, become quite low over the face. They are hardy pigs, and adapt themselves quickly to changed surroundings, and give a good return for the food consumed. They are not as prolific as some of the

other breeds, but their fecundity is improving. The Poland China may be described as primarily a lard pig, and would have to be crossed with one of the lean breeds in order to produce progeny that would yield a pork or bacon suitable for the present market.

### GLOUCESTER OLD SPOTS.

A breed that has been lately introduced into Victoria is the Gloucester Old Spots. It originated in England, and the first part of the name is derived from the English county. The marking is black and white, or white and black spotted, and in some cases the colouring is rather striking. The ears are pendulous, drooping well forward. They are large-bodied, fast-growing pigs, carrying a great deal of lard and heavy bone.

### THE DUROC JERSEY.

A breed new to this State is the Duroc Jersey—an American pig. The Jersey Red pigs, taking their name from New Jersey, were probably descendants of sandy-coloured Berkshires imported into

**Bacon Pigs sired by Large York Boar.**

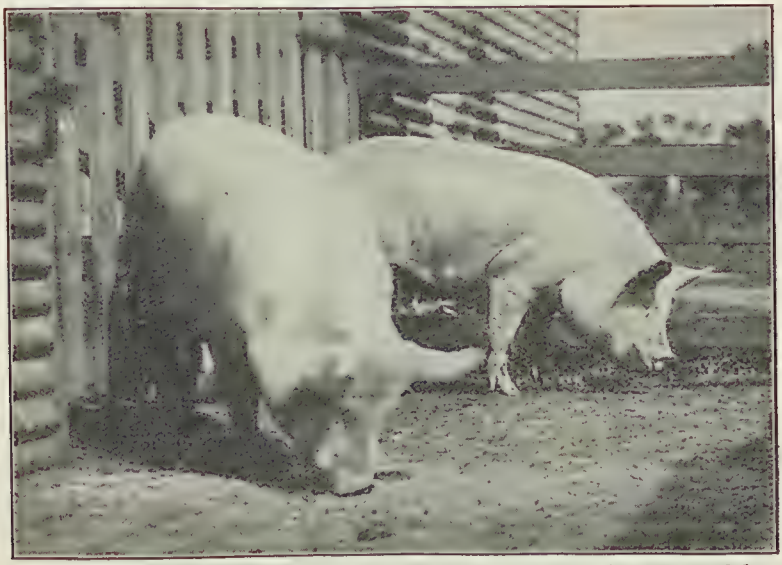
(This photograph was taken at the farm of Mr. Allez, Echuca West. Since using a Large York Boar, Mr. Allez is able to market his pigs a month earlier than previously.)

America many years ago. The Jersey Reds were usually of a dark-red; some were, however, light-sandy often patched with white. The first Durocs were raised in Saratoga, New York county, and were the progeny of a pair of red pigs purchased from a Mr. Kelsey, who owned a famous stallion Duroc, and the breed was named after the horse. The Duroc and the Jersey Red pigs were crossed, and the result was the present Duroc-Jersey breed, a name first used in 1857. The breed has been developed chiefly in Ohio. The colour varies from light-sandy to cherry red. The ears fall forward. They are good grazers and mature early. They belong to the lard type.

### THE MULE FOOT.

Another breed, which, though not known in Victoria, is perhaps worth mentioning. It is the Mule Foot, a name given on account of this pig's solid hoof, which is narrow, like that of the mule. Some

writers claim that pigs of this type were bred many years ago in Sweden and Norway, and also extensively in England about 1810. They have been known in America for about a hundred years, and several authorities believe that they were brought to America from the South Sea Islands. In shape they resemble the Poland China. Their colour is black; sometimes, however, white spots may occur, and are not regarded as a blemish. The Mule Foot is typical of the lard type of pigs; it attains a fair weight—probably the usual weight would be from 400 lb. to 500 lb. for sows; boars would be 100 lb. heavier. The average litter is eight. They are prepotent when crossed with other breeds, the solid foot being produced to a pronounced degree. Breeders



**Two Large York Bacon Pigs on the Farm of Mr. Trevor Harvey, Boisdale, ready for Market.**

WEIGHTS.

| | On Farm. | At Factory. | Dressed. |
|---|---|---|---|
| Barrow | 215 lb. | 190 lb. | 148 lb. |
| Sow | 203 „ | 176 „ | 145 „ |

claim, and appear to be justified in doing so, that the Mule Foot is to a certain degree immune to hog cholera. Among their many good points are their ability to fatten readily and to produce pork of fair quality.

## THE LARGE WHITE YORK.

There are numerous other breeds, but probably the one best known all over the world is the Large White York. This pig was raised in Yorkshire, whence it takes its name, and seems to have first come into prominence in the eighteenth century. As its name denotes, it is a large pig and white in colour. It belongs to the lean or bacon type. The head is long and light, free from heavy jowl; neck of fair length; the body is long, deep, well proportioned, and free from wrinkles; ribs are well sprung; quarters are deep and wide; coat is long and silky; legs straight, with good quality of bone.

Objectionable points in the Large York are narrow head; coarse thick ears; heavy jowl; coarse shoulders; crooked legs; blue or black spots on skin; crest on neck, coarse curly coat; clumsy gait; weak loins.

The Large Yorks are hardy; they are good grazers, responding well to open-air keeping. They are prolific, docile, and give a good account of all food consumed. They produce a lean bacon of good flavour that is much sought after in many parts of the world. No other pig can claim the same popularity. In Denmark, Holland, Ireland, and Canada they have proved their worth; in the United States they are becoming more common every year, and in recent times Russia imported a large number of the breed. It is the Large York that has made the pig industry in Denmark so successful. They may be crossed with several other breeds to beget progeny which will grow quickly and yield the right quality of pork and bacon at a minimum cost for food.

### Undesirable Characteristics in Pigs.

Hereunder are a few hints on undesirable characteristics in pigs, and those showing any of them should be avoided:—

> Any coarseness in ears, coat, tail, or shoulders; light girth; narrow chest; hollow back; crooked legs; fat-heavy jowls, narrow forehead; thin flanks; pigs showing crests or dipping between shoulders.

### Lean Bacon and Pork Required.

If our farmers can produce an article that people relish, there will be a demand for large quantities. Ninety per cent. of the pork one sees for sale at the present time is too fat. The taste is for lean meat, and the quicker our farmers discover this the more profitable will it be for them. People will not pay for fat which they cannot eat, but if a tender, lean bacon and leaner pork be put on the market, the present demand will probably be doubled in a very little while. To those about to begin pig-farming, the first piece of advice is—Start with the right animals, so that you may be able to market what the consumer wants. When an export trade is begun, breeders should find out exactly the sort of article the people on the other side of the world will buy, and then endeavour to meet the demand.

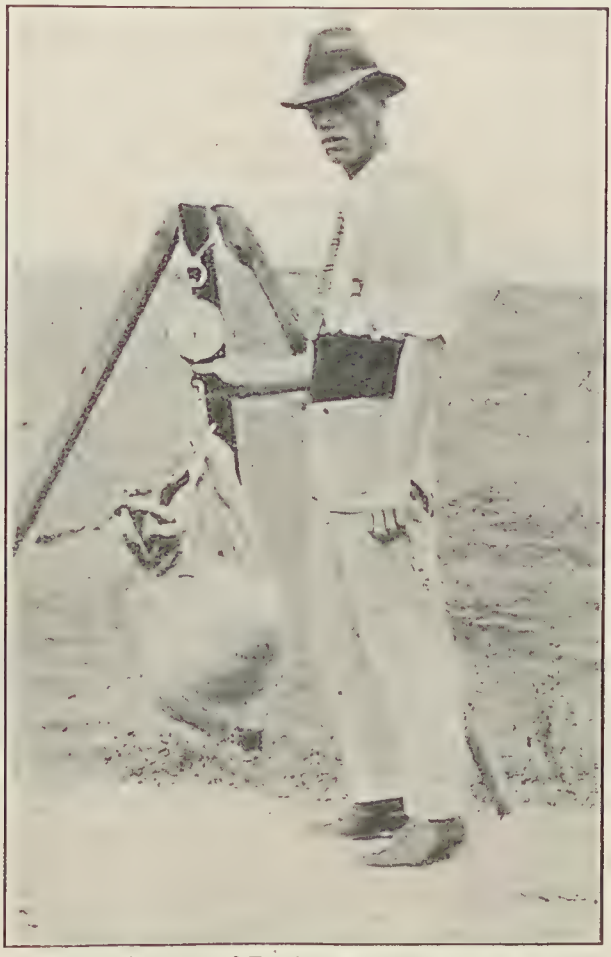
There are at the present time in Victoria good strains of Middle Yorkshire and Berkshire; either of these breeds crossed with the Large York boar gives excellent results. The Middle York and Berkshire alone carry too much lard; the cross produces a faster growing pig with leaner bacon and good hams. The Large York is a pig of quick growth, with length and depth, and gives the streaky bacon with a good proportion of lean meat. The Middle York and Berkshire cross will produce a good ham.

When starting a herd it is not necessary to obtain pedigreed sows. Good lengthy sows from mothers noted for prolificacy and fast-growing litters should be chosen. Good grade sows will give satisfactory results provided that the boar is of the best quality. A pure-bred boar must always be selected, and particular attention should be paid to his shape. Coarse, short, wrinkled pigs showing crests must always be avoided, as well as animals with such defects as

crooked legs, splayed feet, and thick jowls. Coarse shouldered and heavy-boned pigs are also undesirable.

The boar should not be allowed to get too fat, but kept rather in good forward store condition. If this be done, his period of usefulness will be longer, and he will beget better litters.

We would advise intending pig-breeders to start with only three or four sows until they get accustomed to handling pigs, and then they



**Mr. C. Edwards, of Bacchus Marsh, weighing slips.**

could launch out on a larger scale. There are numbers of unforeseen troubles that arise, and a reverse at the commencement, if one begins in a big way and has not the experience to meet the difficulty, may so dishearten him that he will go out of the industry altogether.

There are two ways of handling pigs. One is the old and somewhat obsolete method of keeping them in sties from the time they are farrowed till they are ready to market; the other and newer method is to run them in the open on pasture; this is sometimes called the outdoor or open-air method.

### Why Farmers Should Breed their own Pigs.

In ordinary circumstances a weaner can be reared for about 7s. 6d., or 10s. at the most. Usually it will cost from £1 to 25s. in the open market. Most experienced breeders know that it is not profitable to feed slow-growing pigs, and any that are not thriving as quickly as expected should be sent into the market at once. Farmers occasionally keep a mongrel boar, though it never pays to rear young pigs by an ill-bred sire, for there is always a difficulty in fattening them. Again, unfortunately it is not rare to see young pigs kept in a half-starved condition, and it is very unlikely that any that have had a check in early life will ever prove profitable.

Another reason why a farmer should breed his own stock, if possible, is that strange pigs may introduce disease. Further, pigs from ill-kept carelessly-managed farms are sometimes wormy; not only will it never pay to fatten such, but they are apt to infect healthy animals.

So it can be safely said that it pays a farmer better to breed his own stores. A further advantage of breeding one's own stock is that by carefully selecting the best and quickest growing sow pigs the quality of the herd can be improved, and by continually selecting gilts from the largest litters, the average number in later litters will be increased.

There is much variation in the individuality of each pig, and many farmers do not appreciate the improvement that can be made in the value of a herd by a choice of the best breeds, by selection and ascertaining the animals that respond well to feeding.

### The Scales almost an Essential.

At the present time the Department of Agriculture is advising all farmers to install scales, so that they may weigh the food given to the pigs at each feeding, and also weigh the growing pigs periodically. Numbers are following the advice, and are beginning to build up lucrative herds. Sometimes one pig in a litter will double the gain of some of its mates. If a sow, she should most certainly be kept for breeding. If the best-shaped and the fastest-growing pigs are selected as breeding stock, in a few years a farmer will have a herd of remarkably good animals. Buyers complain that large numbers of pigs come into the market too heavy for pork and too light for bacon. The dressed weight of a baconer should be from 110 to 140 lb.; that of a porker from 60 to 80 lb.

With the use of scales the size will be standardized, and the farmer will get a better price. Buyers always prefer to buy on exact weights rather than by guesswork, for the most experienced will sometimes guess wide of the mark.

### Care of the Sow.

The cheapest and the best way to keep a sow is on pasture with a fair run. Then she will need very little other feed. Pastures, which should consist of a mixture of clovers and grasses, will, of course, be improved by top-dressing. Any one not accustomed to pigs will be surprised to see how fat and healthy they will become on pasture.

Mr. Purnell, at Moriac, carries from 20 to 30 sows on 7 acres. They get a little grain in the winter if the grass be short, but during most of the year they thrive exceedingly well on pasture alone.

If a breeding sow were kept in a sty and fed on grain only, probably there would be a number of deformed and dead pigs in each of her litters. The reason for this would be that she was not getting an ample supply of protein or flesh-forming foods.

If fed only on potatoes and mangels or pumpkins, she would be liable to abortion. The trouble in this case too would be that she had not been receiving sufficient of the necessary flesh-forming foods, and had had to draw on her reserves. Even if sows fed in this way bring forth a live litter, the mothers will sometimes eat the little ones. This seemingly unnatural action is almost always the result of improper feeding—the poor brutes have not had sufficient protein feeds, so neces-

**Middle York Sows on Lucerne at the Farm of Mr. Cliff. Edwards, Bacchus Marsh.**

sary at any time, but particularly so during periods of gestation, and consequently they cannot resist the temptation to eat their own young. Every care should be taken, therefore, to see that a breeding sow is supplied with the correct amount of protein in proportion to the carbohydrates (fat-forming, heating, and energy-supplying foods).

When food is prepared in the ratio it is needed, we call it a balanced ration. This subject will be discussed at a later stage. A sow close to farrowing should be fed in the proportion of 1 lb. protein to 4 of carbohydrates. Separated milk contains protein and mineral matter, while grains, potatoes, mangels, or pumpkins will supply carbohydrates. A sow's rooting the ground is an indication that something is lacking from her food; it may be mineral matter, but usually it is protein, and she roots in search of worms, so that the want may be supplied. A pig fed a balanced ration will rarely root; in fact, she does so only when her food lacks some necessary element.

If sows are fed on grain, and no milk or green fodder is available, meat meal and lucerne chaff should be fed. A fair mixture would be 100 lb. barley, from 20 to 30 lb. lucerne chaff, and 12 lb. meat meal. When milk is available, 3 to 4 lb. of grain to the gallon of milk will form a reasonably balanced ration.

Sows running on pasture, besides costing less to feed than sty-fed sows, are much healthier, they have less trouble farrowing, have larger litters, and the young pigs are larger, hardier, and thrive better. Before placing the sow in the farrowing pen, her sides and udder should be washed thoroughly with warm water and soap, and she should be given a supply of clean fresh bedding. Dirty sties and soiled udders and teats may mean wormy pigs. Preventing infection is far preferable to attempting to effect a cure later.

When a sow has farrowed, feed balanced in the ratio of 1 to 4 should be continued as long as she is suckling the young pigs. At no time should there be any lessening in the quantity of food fed to the

**Pigs running in Lucerne at the Farm of Mr. C. Edwards, Bacchus Marsh.**

mother, for more than two-thirds of it will go towards the making of milk for her young.

Sometimes a sty-fed pig may become constipated; any signs of this trouble should be looked for. Usually a little bran will correct it. The grain allowance should be reduced and 1 lb. of bran substituted for 1 lb. of grain. When a sow is on pasture there is little danger of constipation; green feed keeps the bowels in good order.

The young pigs when farrowed will average about 2¼ lb. in weight. They will increase at about the rate of ¼ lb. for some days, and should double their weight in ten days. They will then continue to increase at about ½ lb. per day until they attain the weight of 80 to 100 lb.; thereafter they should increase at the rate of 1 lb. per day. Seven-months' old pigs should weigh approximately 200 lb., or a little more. Fast-growing bacon pigs will reach that weight in five and a half to six months.

*(To be continued.)*

# WINTER CARE AND SHELTER OF FARM ANIMALS.

**An Address by J. M. Kerr, Chief Dairy Supervisor, broadcast through 3LO.**

The name which has been given this subject, namely, "Winter Care and Shelter," refers, of course, to the animals on a dairy farm, and particularly milking cows. Winter care being specified, you will suppose, if you were not already sure, that the winter season possesses properties of its own which differentiate it, in effect, from the other seasons of the year as far as the necessities of animal husbandry are concerned.

There is no need to tell any dairy farmer that winter is a severe season on animals. Most farmers have learned this from the best of all teachers, experience. They know it all right, and the wonder is that the severity of the lesson has not been sufficient to discipline them into the necessary protective measures which—I hope to show you—are as rational as they are necessary.

Before coming to the point of recommending the remedy—it should almost suggest itself when we have reviewed the circumstances in detail—let us see what special power winter has to interfere with the well-being of dairy cattle at all.

The outstanding distinction of winter is its relatively greater coldness, due, of course, to the less and weaker sunshine. Now, warmth and sunshine are the very life of plants. In the absence of these two factors, plants don't grow. Think, then, what this means to animals which have been deprived by man of their natural freedom to follow the pasture, and to enjoy as well, in natural state, the abundant shelter which was at one time everywhere for the choosing.

Owned, as cows now are, by man, they must stay where they are put, whether their owner makes adequate compensation for their lost foraging freedom, or whether he does not. Most cows, it is sad to relate, are in the hands of men who do *not*.

Such men may protest, "Didn't we clear the timber to allow them more grass?" Too true; and thus deprived the unfortunate creatures of shelter as well.

All grasses practically stop growing in winter; and yet the bulk of dairy farmers run their cows in such a way as to have them totally dependent on the pasture making regular growth all the year through.

A cold snap—as some at least of you know—will cause even a well-fed cow to give less milk. What, then, of cows whose only chance of food is pasture that has already been over-eaten, and can't re-grow?

The blow which winter deals such cows is a double one; the first, direct, by the increased strain of a colder environment on their heat reserves; and the other—to the detriment of that same heat reserve—by withholding the only fuel by which it can be generated, namely, food.

Winter thus practically causes *greater* appetite and *shorter* rations at one and the same time—a very unpleasant arrangement for the

cow, you will agree, and equivalent to "burning the candle at both ends" as far as her heat reserves are concerned.

The importance of maintaining the heat supply will be seen when it is recognized that not one of the millions of cells in the body will fully work at any temperature lower than normal (101½ degrees), and that it is only by every unit-cell fully doing its job that any animal's body can function properly.

This, then, is our cue: Winter air is cold, and a cow functions by heat. The first effect of winter will therefore be, more or less, the same as occurs when any cold body is brought into contact with a warmer one. Heat leaves the warm body—in this case, the cow—for the colder—the atmosphere, because, in virtue of its very nature, heat must inevitably move from a hotter carrying medium to a colder, as long as it has passage-way.

The rate at which the cow thus loses her body heat depends on how much the adjacent air is colder than her body.

When the temperature of the air falls, it exercises a much greater pull on the body heat of the animal, and the body has to meet the position by closing the pores and withdrawing the blood—more or less—from the surface. Should it fall very low, however, the loss will go on, despite all that the body can do, unless it withdraw the blood so deep that the external parts receive practically no warming blood at all, and consequently lose their normal temperature, and with it their function. This is heroic action; but it frequently occurs. (We have a homely instance of it in our fingers becoming numb on a frosty morning.)

In extreme cases, nature is always ready to deprive the non-vital parts of their heat, and consequently their function, in order to conserve the requisite degrees of heat in the more vital. It is a case of "Safety First."

This, as it applies to the udder of a cow, is what makes it so unprofitable to neglect the heat reserves of one's cows. Milk secretion, no doubt, is, from the dairyman-owner's point of view, the most important function a cow has; but, don't forget, an absolute superfluity as far as she herself is concerned.

Being more or less an extremity of the body, the udder is one of the non-vital parts always first called upon to forego their heat supply whenever the body's normal temperature is threatened, as it must essentially be—in a fatless, under-fed cow—every time external temperature falls low enough to levy toll.

With the udder's heat gone, its function is gone also; and with its function, any worth-while money-earning capacity the cow might have possessed. It is for the dairyman to remember that udder-cells, like all a cow's other cells, must be sustained very very close up to the normal 101½ degrees if they are to function at all, and quite up to that temperature if they are to function properly.

This is no inconsiderable degree of heat to maintain, in the face of hostile external elements that are only too eager to levy toll. If the milk-secreting function is not to go by the board, man must lend a hand and see that not only has the cow the means of employing her digestive generators to the full, but that she also starts the winter with

some condition on her, in the shape of stored-up fat, to be drawn upon, as assistance to the food, in dire emergency. When the cow is dry is the opportunity to put on body-condition—the best preparation of all for a rich lactation.

The main problem of winter to the dairyman, then, is "How can one best help the cow to preserve her normal body temperature with least sacrifice of her money-earning function?" Obviously, if we would conserve anything, we must look to both the supply and the possible escapes (or leakages).

Take the supply first. As long as the weather temperature is lower —as it usually is—than body temperature, any heat gained by the body can come from only one source—the food.

Yes; the body-warmth that the cow possesses, and which we know of—because it can be felt and measured—is not a thing which has been put there to stop, and to say "put." It is constantly being used up for working energy, and dissipated into space by the breath, and by surface-conduction through the pores. At all times, without ceasing, heat-regeneration must go on.

The generating is done by digestion of food, and the process is hardly any different from ordinary burning or combustion—as we see it in the stove or grate. The food, like wood or coal, or any other fuel, contains carbon, the only difference being that food-carbon is in the form of starches and sugars, which are soluble to the digestive juices. The food also contains hydrogen, which, as every one knows—in this petrol and airship age—is more inflammable than carbon.

We know carbon will burn, because we see wood or coal burning every day. We know fat or oil is even a fiercer fuel, for who of us has not heard the saying, "The fat is in the fire," used to describe the makings of a particularly fierce quarrel. Well, foods consist of carbohydrates, which are mostly carbon, as is coal, and they also consist of fats or oils—mostly hydrogen.

These food substances, carbon and oil, coming into contact—in the enclosed body-tissue—with the air which the cow inhales, a glow of heat is set up, differing in nothing but degree from the glow of wood in the grate, or of kerosene in the primus stove—when the oxygen of the air there combines with them.

The blood takes up the heat as it is generated by digestion, and distributes it throughout the millions of cells which constitute the tissue of the body.

My object in risking wearying you with these more or less technical details of food digestion is to impress on all whose listening might be for the sake of their cows, how utterly unreasonable it is to expect efficiency of milking function without the food supply being right, as regards both quantity and quality.

I would have all dairymen get this fact into their minds by thinking what fuel means to a furnace, and then remembering what has been said to show that a cow's body is really a combustion chamber, and fodder its fuel.

The food supply, then, is obviously what one must first look to in defeating winter depletion of the heat reserves, for the simple reason

that the food supply *is* the heat supply, and before we can think of "reserve" at all, we must first ensure "supply."

This opens up the big question of year-through fodder provision, which is a subject in itself, and must be deferred till another time.

It is pertinent, however—since I have told you that fodder is the greatest factor in efficiency of function in winter time—to indicate what turn your food-rationing should take in cold weather as compared with mild. You, of course, know that, generally speaking, cows—in Victoria at least—get less food in winter time than they do at any other time of the year. This truly is an utterly wrong practice. They need more; and what is just as true, most farmers' cows have plenty of room for more. So that, if the general run of dairymen would only see that their cows got the necessary *more* food in winter, much good would result to the industry from this one step alone.

This advice applies quite positively to that vast class of cow, commonly known as the "average dairy cow," as managed by the average dairy farmer. There are, however, some comparatively advanced dairy farmers who do aim at giving their cows *all* that they will eat *all* the year round.

These will already have learned by experience that it takes more feeding to satisfy a cow in winter than it does in warmer seasons, and such men, no doubt, are already wisely engaged in supplying more, but relying mainly on greater quantity alone.

For the ordinary class of cow this, no doubt, suffices; but with first-class cows—which turn a much greater proportion of a heavy ration into milk—better results will be obtained by giving special attention to quality rather than quantity, in that extra part of the ration necessitated by winter.

As the extra call is for body-heating purposes only, one can supply the need with least displacement of milk-making ingredients by introducing more largely into the ration the most efficient heat-producing foodstuffs we know of, such as the oil-meals, which would seem to be meant by nature for just this emergency.

This brings us to the fact of all foodstuffs not being of the same heating value. Hydrogen as a fuel is much more efficient than carbon, and it is hydrogen which is the chief component of oil or fat.

In determining to make more use of oil-meals, however, it must be remembered that oil or fat is an ingredient which can be easily overdone in cattle-feeding, and oily foods must be used in moderation only at all times. But the digestive apparatus can certainly deal with larger percentages of oil in cold weather than in hot, as instanced by the Eskimo's relish for blubber and oil, and also by one's own greater partiality to fatty dishes in cold weather. This fact, in itself, gives us an opportunity to use these most effective heat-producers in the greater proportions that all good feeders would wish to.

In cold weather, a cow's daily ration may safely include up to 4 lb. of linseed meal; whereas in summer time it might not be wise to feed much more than half of this for fear of sickening the animal. Maize-oil-meal and rice-meal are richer still in oil, and either must be fed in somewhat less proportions than linseed-meal.

Other oil foods are cocoa-nut cake and cotton-seed meal, both of which are—like the others mentioned—helpful to a cow when the winter tax and the heavy burden of abundant milk secretion have to be borne at the same time.

A special virtue of oil-meals—and linseed-meal in particular—is that they are most effective in building up a heat reserve of fatty tissue, which can readily be oxidized for heating purposes when the need is too urgent to be met by the digestive functions alone.

A fatty layer under the skin constitutes also an effective cushion of non-conducting tissue, through which heat cannot so easily be depleted.

When this is present, the animal takes on an appearance of sleekness and well-doing very pleasant to look upon.

Oats is another foodstuff comparatively rich in oil which can always be recommended for winter, either as a green grazing crop or fed as crushed grain.

Another means of considerably relieving the cow of winter's heavy tax is to let her ration be ready-warmed; otherwise, it must be warmed in her body at the expense of heat, which has taken food to generate.

In this regard, the common practice of pouring boiling water on the ration some twelve (12) hours before, and covering it with bags till using, is good.

Now, all the foregoing suggestions, if applied, will serve to ensure the full necessary heat being generated as far as it is practicable to do so.

Let us now see what can be done to assist in fully conserving it where it is most wanted—within the hide.

In this objective, we can very well be guided by the housewife's method of keeping a pot of tea warm. She knows that the heat is in the tea all right, but she also knows that it won't stay there long if the cold air is allowed to play around it. So she protects it with a cosy.

It is a pity the average dairy farmer is not as wise about his cow. The aim of the dairyman should be to intercept the heat loss by intercepting access of cold air with some non-conducting material that is also waterproof.

A well-fitting canvas rug, lined with coarse collar check, serves the purpose admirably. These cost about 35s. A good makeshift rug may be made by stitching two wheat sacks together lengthwise, and another across the end of the pair.

To fix this on the animal, fasten in front of the brisket, and use also a fastening of soft rope or soft leather (loopwise) around each hindquarter separately. If cows have much distended udders, it is better to depend only on a chest-strap, a breeching strap, and a girth.

The grease from the hide will soon make these coverings waterproof, although it is always preferable to use rugs with the waterproofing material on the outside surface.

Rugs, of course, should be put on or taken off according to weather temperature. They might well be put on every night in winter; but advantage should be taken of every mild day to remove them, to prevent accumulation of scurf on the hide.

A rug effects economy in extreme cold, either by saving some food, or maintaining the milk yield. If one of these effects is not noticeable, depend upon it, the other has been accomplished in some measure.

It has to be remembered that, when heat leaves the body in its efforts to equalize temperature, the air which receives it becomes warmed in proportion to the heat which the body has lost to it.

If the atmosphere happens to be still, this warmed air lingers close around the body longer than it does when air is moving—as in wind. Once warmed, this air does not draw the heat at it did when it was cold, and while such air is not forced to move on, the drain on body heat ceases to be so serious. If, however, the air happens to be cold, and in motion at the same time, the cow's heat is taken clear away and fresh cold air is continually operating.

Constant renewal of the cooling medium is the principle adopted in the milk-cooler, and also in the radiator of a motor car. Every facility is there given for the warmed water in the one instance, and the warmed air in the other, to move and make way for fresh, that is colder.

This, then, is what we would avoid in case of a cow which we do not want to cool. It is why she herself will seek the leeward side of a wall or hedge—the air is stiller there, and consequently makes her less cold.

This is why, also, farmers might well make a point of providing wind-breaks, in the form of either hedges, timber belts, or even a short length of closely-boarded shelter, say 6 feet high, behind which the cows could camp on occasion.

A point to be remembered in tree planting is that one tree effectually protected at the time of planting, and kept protected, is better than 1,000 unprotected, for the latter will never survive on a dairy farm. Protection there must be, low enough to exclude a calf, and high enough to thwart a horse.

In dry districts, sugar-gums thickly planted in a grove stand pre-eminent. In the south, nothing will give you better results than the ordinary *Pinus insignis* planted similarly, or the horizontal cypress (*Cupressus Lambertiana horizontalis*) planted as a hedge. Even tea-tree is well worth preserving in this regard.

In such measures, we have the means of largely defeating heat loss —the second step in body temperature conservation.

Much has been said on the dietetic virtues of fat in cold weather. This is all for the benefit of the cow. Now, before closing, I will give you a tip for yourselves. Butter is a fat. If you will all let the amount of butter you eat in winter be limited by your livers, it will be warmer for you, and it will help the dairy farmers to help their cows.

# VARIOUS EXPERIMENTS WITH WHEAT, ETC.

## SALISBURY, 1925-26.

### Conducted on the Farm of Mr. W. E. Dahlenburg.

*Report to the Nhill Agricultural Society by H. A. Mullett, B.Agr.Sc., Superintendent of Agriculture.*

As the season turned out, it constituted a remarkable test of the efficiency of the farming methods practised at Nhill, and of the drought-resistant qualities of the wheats grown. Except for a few light showers, no rain fell in October, or in the first three weeks of November, the most critical time in the growing period of the crops.

At hay-cutting time there were many in the district who were exceedingly pessimistic as to the yield they would obtain. However, despite the dry season, the returns in most cases were surprising.

### Wheat Variety Trials.

The yields of wheat on the experimental plots conducted by Mr. W. E. Dahlenburg, at Salisbury, averaged about 32 bushels an acre, and no doubt there were many fields in the district which yielded as well as these, and, in some cases, even better.

The results obtained show that by the use of modern methods the wheat-grower in the Wimmera can, to a large extent, defy drought.

TABLE 1.—RESULTS—WHEAT VARIETY TRIALS.

*Sown 11th June, 1925.*

| | Bushels per acre. |
|---|---|
| Wheat—Seed, 75 lb. per acre; Super., 1 cwt. per acre. | |
| Rajah | 39.9 |
| Wannon | 37.3 |
| Nizam | 37.0 |
| Free Gallipoli | 36.6 |
| Federation | 34.7 |
| Ghurka | 31.4 |
| Sepoy | 26.6 |
| Marmora | 25.6 |
| Oats—Seed, 70 lb. per acre; Super., 1 cwt. per acre. | |
| Palestine | 30.6 |
| Algerian | 24.0 |

The highest yield was obtained from "Rajah," which beat every other variety by more than 2 bushels to the acre. It probably owed its prolificacy last year to its earliness, as this characteristic undoubtedly enabled it to mature its grain before the hot winds had affected it.

Rajah has done well in the Mallee districts, and was recommended by the Ouyen convention of Mallee farmers last October as a variety which Mallee farmers should grow. It is well worth testing carefully on the land near Nhill.

Rajah is a cross between Indian and Telfords. It has a creamy coloured chaff, with somewhat clubby heads.

Rajah, Wannon, Nizam, and Gallipoli, 58/1, were all ahead of Federation in yield. Gallipoli, 58/1, was tipped by the hot winds, but,

despite that, it yielded considerably better than was expected from its appearance; and this was the general experience throughout the district. It has been decided to name this variety "Free Gallipoli."

When the average yields for the past three years are considered, it will be seen that Free Gallipoli headed the list.

TABLE II.—SHOWING AVERAGE RESULTS FOR THREE YEARS OF VARIETY TESTS AT EXPERIMENTAL PLOTS, SALISBURY.

| | Bushels per acre. |
|---|---|
| Free Gallipoli (Gallipoli 58/1) .. | .. 47.3 |
| Nizam .. .. .. | .. 46.6 |
| Wannon .. .. .. | .. 45.1 |
| Rajah .. .. .. | .. 44.9 |
| Federation .. .. .. | .. 43.6 |

## Oat Trials.

Palestine Oats again beat Algerian, and the average yield over the period it has been grown at Salisbury (1924 and 1925) shows it to be 5 bushels to the acre better than the latter. Palestine is essentially a short-strawed grain variety, which matures about a fortnight earlier than Algerian, and is especially useful where grain alone is desired. It has not become popular at Nhill, though farmers in the Mallee districts further north are greatly interested in it, as they consider that by sowing a paddock or two with it they will be enabled to complete the harvesting earlier.

## Manurial Trials.

FEDERATION WHEAT 75 LB. PER ACRE.

The plots are duplicated, the first or early section being sown in late May or early June, and the second or late section about one month later. In 1925 the early-sown plots were seeded on 4th June, and the late-sown on 1st July.

TABLE III.—YIELDS OBTAINED WITH VARYING QUANTITIES OF SUPERPHOSPHATE FROM LATE-SOWN AND EARLY-SOWN PLOTS.

| | Sown early. Bushels per acre. | Sown late. Bushels per acre. |
|---|---|---|
| No manure .. .. | .. 33.2 .. .. | .. 28.8 |
| Super. ½ cwt. per acre | .. 37.4 .. .. | .. 30.8 |
| Super. 1 cwt. per acre | .. 36.2 .. .. | .. 31.0 |
| Super. 1½ cwt. per acre | .. 36.9 .. .. | .. 32.9 |
| Super. 2 cwt. per acre | .. 37.2 .. .. | .. 31.9 |

The average results for five years are as follow:—

TABLE IV.—AVERAGE YIELD FOR FIVE YEARS FROM VARYING QUANTITIES OF SUPERPHOSPHATE ON LATE-SOWN AND EARLY-SOWN PLOTS.

| — | No Manure. | Super. ½ cwt. | Super. 1 cwt. | Super. 1½ cwt. | Super. 2 cwt. | Average. |
|---|---|---|---|---|---|---|
| Early sown .. .. | 40·0 | 43·7 | 44·3 | 44·6 | 45·1 | 43·5 |
| Late sown .. .. | 36·9 | 39·3 | 40·7 | 41·9 | 41·4 | 40·0 |
| Increase due to early sowing | 3·1 | 4·4 | 3·6 | 2·7 | 3·7 | 3·5 |

The results are now regarded as conclusive proof that the late sowing, as practised on the Horsham plains, is not profitable under Nhill conditions. It is proposed, therefore, commencing this year, to alter these trials, so that they will afford a comparison between winter fallow and summer fallow.

The heavier dressings of manure on the Salisbury plots have not shown up to the same advantage as they have done at Horsham and Warracknabeal. Averaging both series of manurial plots since they began six years ago, the following figures are obtained:—

Table V.—Showing Increase in Yield due to Heavier Dressings of Superphosphate.

| | Bushel per acre | Increase due to manure (bushel). |
|---|---|---|
| No manure .. .. | .. 39.9 .. .. | .. — |
| Super. ½ cwt. per acre | .. 42.9 .. .. | .. 3.0 |
| Super. 1 cwt. per acre | .. 43.7 .. .. | .. 3.8 |
| Super. 1½ cwt. per acre | .. 44.4 .. .. | .. 4.5 |
| Super 2 cwt. per acre | .. 43.9 .. .. | .. 4.0 |

The most profitable dressing is therefore, obviously, 1 cwt. per acre. The explanation of the absence of any response from dressings as high as 2 cwt. to the acre is undoubtedly due to the extreme richness of the paddock in which the plots are sown. Careful analyses undertaken in the Departmental Laboratory show this soil to be unusually rich in phosphoric acid.

The plots are sown after fallow on permanent sites, and there are indications that where less than 1 cwt. of superphosphate is being applied, the supplies of phosphoric acid in the soil are gradually declining. For instance, the yield on the unmanured plot for the years 1920 to 1922, inclusive, was 41.6 bushels per acre; whereas for the period 1923 to 1925, inclusive, it was 38.3 bushels.

The addition of 1 cwt. of superphosphate has maintained the yield over both periods at about the same level, viz.: 43.6 bushels for the first three years, and 43.9 bushels for the second three years. Thus, the application of 1 cwt. of superphosphate is of increasing importance. For the first period, 1 cwt. of superphosphate gave an average increase over the unmanured plot of 2 bushels to the acre, while for the last period the corresponding increase was 5.6 bushels per acre.

To replace the phosphates taken out of the soil by a 36-bushel crop, it requires at least 1½ cwt. of superphosphate; hence it is likely that in the future the experiments at Nhill will show that even higher dressings than 1 cwt. are profitable—certainly 1½ cwt., and possibly more.

## Gypsum Tests.

Oats were grown on the plots treated with gypsum in 1924. Although the crops were not preceded by fallow, they averaged about 10 bags per acre. The plot treated with superphosphate 1 cwt. (no gypsum) yielded 31.4 bushels an acre, and that to which the heavy dressing of gypsum was applied gave 36.8 bushels per acre. This indicates that gypsum had a considerable residual effect. However, owing to its patchy nature, the field is not altogether a desirable one

on which to carry out exact tests. Accordingly, a new set of official tests, more comprehensive than any hitherto undertaken at Nhill, has been laid down in a field where the soil is of a more uniform character. It is hoped that reliable data will be obtained from these plots, which will be worked on a three-course rotation—fallow, wheat, oats.

Following on the results from these plots, the use of gypsum for the improvement of the texture of stiff red clays is extending throughout the Wimmera.

### Turner Cup Competition.

Now that the Nhill Agricultural Society, in its Turner Cup Competition, is supplementing the experimental plots conducted by the Department of Agriculture, it is desirable that the results of the work should be mentioned in this report. The results to date are as follow:—

| | |
|---|---|
| Summer fallow (average of 8 plots) .. | 30 bushels 40 lb. per acre |
| Winter fallow (average of 8 plots) .. | 27 bushels 58 lb. per acre |
| Increase due to summer fallow .. | 2 bushels 42 lb. per acre |

Further details of this work are given in the judge's report of the competition.*

### Proposed Tests at Longerenong.

In view of the interest aroused by these cultivation tests, it has been decided to lay down a comprehensive series of cultivation trials on the Departmental plot at the Longerenong Agricultural College. The land has already been fallowed, and will be sown to wheat next year.

These plots will afford valuable data, not only on comparisons between summer and winter fallow, but also as to depth of ploughing, depth of mulch, effect of cultivating the land dry in summer, and so on.

* * * * * * * *

In conclusion, it is desired to congratulate the Nhill Agricultural Society on the successful results of their educational efforts for the season.

* See this *Journal* for June of this year.

# MURRAYVILLE CROP AND FALLOW COMPETITIONS, 1925.

## THE CROP COMPETITION.

*Report of the Judge, J. Brake, B.Agr.Sc., Chief Field Officer.*

Some remarkably good wheat crops were entered for this competition, which covers an area extending from Danyo to Pinnaroo.

The excellent yields obtained are a true indication of the high standard attained by the majority of farmers in that district. Whilst it is admitted that the conditions are a little more favourable than in other parts of the Mallee, still the progress made in the fourteen years or so of settlement has been very great.

It was quite evident that the competitors are very keen to supplement their practical knowledge with information gained from experimental plots and the scientific study of wheat-growing. Apart from the better methods of cultivation which have been adopted with such profitable results, one characteristic of the crops that was more pronounced than in other districts, was their purity. Inquiry showed that full use has been made of the local departmental plots for the purchase of pure seed.

**A View of the Winning Crop—Yandilla King.**

Careful work in co-operation with farmers of the Wimmera and Mallee during a period of some years, has enabled the Department to enunciate certain definite principles in regard to wheat-growing, the adoption of which is steadily raising the average yield. In the last twenty years the average yield in the Wimmera has risen 200 per cent.—from 7 bushels to 22.5 bushels per acre.

Early and very thorough fallowing has shown out to be a necessity for consistently good yields. It is not possible to say how many times a fallow should be worked; that depends on the soil and the rainfall; if the objects of fallowing be kept in mind the practical farmer is the best judge. In our true wheat districts the most important considerations are the conservation of moisture by maintaining on the surface a loose mulch 2½ inches deep and the formation of a firm moist seed bed.

The careful selection of grain for seed is naturally of great importance since that seed is to be the origin of the crop. "As ye sow so shall ye reap" may be applied with perfect truth to wheat-growing.

We should be certain therefore to give the crop every chance by sowing only pure graded seed of prolific varieties.

In nature there is a constant battle going on between factors unfavorable on the one hand and favorable on the other, to man, and it is man's business to assist the latter in order that he may carry on his work of production with profit. Disease is ever ready to attack the wheat crop, and it is necessary therefore that the farmer should acquaint himself with the various diseases and their remedies to be able to assist his crop in its fight for existence.

In the growing of the crop it is essential that ample supplies of all food requirements should be easily available to the plant. By chemical analysis it is seen that our Victorian soils are deficient in phosphoric acid, and it is quite in keeping with this fact that we find in our experimental plots and elsewhere the application of superphosphate always brings increased yields. The great question to-day is not will we apply superphosphate, but how much will we apply.

**The Crop of Messrs. D. Stewart and Sons.**

Generally speaking the quantity of superphosphate now applied is below the actual requirements for highest yield, but it must be remembered in making an increase that the resulting profit will depend to a large extent on the quality of the fallow. At Cowangie on the plots conducted for the Department of Agriculture by Mr. Hecht, the average results for ten years showed that the net profit obtained from an application of 30 lb. of superphosphate was 14s. 6½d. per acre, and from 60 lb. of superphosphate it was 23s. 7d.; 90 lb. of superphosphate, however, gave a net profit of 25s. 1½d. per acre.

It is essential that rotation of crops be practised for highest yields. When the same kinds of crops are grown year after year every opportunity is being given for certain diseases to be carried on in the field and, at the same time, the general fertility of the soil is being lowered.

As stated before, the exhibits in the competition at Murrayville indicate that the standard of wheat-growing methods is high; the adoption of the above principles has been the chief reason for this, and there is no doubt that the standard will go yet higher.

## Awards.

| Competitor. | Apparent Yield. | Purity. | Absence of Weeds. | Absence of Disease. | Evenness. | Total. |
|---|---|---|---|---|---|---|
| **Possible points** .. .. | **35** | **20** | **15** | **15** | **15** | **100** |
| Schultz, F. J. J. (No. II.) ... | 35 | 16 | 11 | 13 | 14 | 89 |
| Schultz, F. J. J. (No. I.) .. | 32 | 15 | 13 | 10 | 14 | 84 |
| Pahl, F. A. J. .. .. | 28 | 16 | 11 | 13 | 13 | 81 |
| Pierson, F. .. .. | 21½ | 15 | 13 | 14 | 13 | 76½ |
| Ross, A. E. .. .. | 21 | 15 | 14 | 13 | 12 | 75 |
| Stewart, D. and Sons (No. I.) | 24 | 15 | 11 | 10 | 13 | 73 |
| Boettcher, F. .. .. | 20½ | 15 | 11 | 11 | 15 | 72½ |
| Stewart, D. and Sons (No. II.) | 25 | 9 | 14 | 13 | 11 | 72 |
| Parkinson, J. .. .. | 20 | 15 | 13 | 12 | 12 | 72 |
| Hallett, J. J. .. .. | 21 | 12 | 11 | 13 | 13 | 70 |
| Cox, T. E. .. .. | 18½ | 15 | 11 | 13 | 12 | 69½ |
| Ross, F. W. .. .. | 20½ | 16 | 9 | 11 | 11 | 67½ |
| Jacob, W. .. .. | 15 | 16 | 10 | 11 | 14 | 66 |
| Wiltshire, H. J. .. .. | 11½ | 15 | 10 | 8 | 13 | 57½ |

## Aggregate.

100 *Acres of crop on fallowed land judged last year.*

| Competitor. | Fallow. | Crop. | Grand Total. |
|---|---|---|---|
| **Possible points** .. .. .. | **100** | **100** | **200** |
| Schultz, F. J. J. (No. II.) .. .. | 84 | 89 | 173 |
| Pahl, F. A. J. .. .. .. | 91 | 81 | 172 |
| Stewart, D. and Sons (No. I.) .. | 94 | 73 | 167 |
| Schultz, F. J. J. (No. I.) .. .. | 83 | 84 | 167 |
| Pierson, F. .. .. .. | 88 | 76½ | 164½ |
| Stewart, D. and Sons (No. II.) .. | 92 | 72 | 164 |
| Boettcher, F. .. .. .. | 87 | 72½ | 159½ |
| Parkinson, J. .. .. .. | 87 | 72 | 159 |
| Ross, A. E. .. .. .. | 74 | 75 | 149 |
| Hallett, J. J. .. .. .. | 77 | 70 | 147 |
| Wiltshire, H. J. .. .. .. | 89 | 57½ | 146½ |
| Ross, F. W. .. .. .. | 71 | 67½ | 138½ |
| Cox, T. E. .. .. .. | 68 | 69½ | 137½ |
| Jacob, W. .. .. .. | 70 | 66 | 136 |
| Cossens, G. J. .. .. .. | 89 | .. | .. |
| Malone, E. .. .. .. | 81 | .. | .. |

## Comments on the Crops.

*Schultz, F. J. J.* (No. II.).—This was the winning crop and consisted of a very fine area of Yandilla King. The heads were very well filled, most of them having three rows of grain across. The crop was unform in density and being still green at the time of judging was expected to yield well. A few strangers were seen, but the purity was above the average. Mustard, barley, wild oats and cockspur were present, but not in any quantity. The crop had been attacked by loose and flag smuts to a slight extent; the drilling was very good.

*Schultz, F. J. J.* (No. I.).—80 acres Federation, 20 acres Yandilla King. The Federation varied in yield a good deal probably due to the nature of the soil; very few weeds, but considerably more flag and loose smut in the Federation that was found in the Yandilla King. Well drilled.

*Pahl, F. A. J.*—This exhibit consisted of four varieties—Gluyas, which was heavy throughout, with a few wild oats and mustard present, but very free from disease. Federation was burnt off in part; some mustard and poppy and loose and flag smuts present. The Rajah was well headed with very few weeds or disease. The Wannon had not stood up to the dry conditions as well as the others, and had dried off considerably.

**Mr. Pahl's Crop of Gluyas (3rd prize).**

*Pierson, F.*—Gluyas 86 acres, Dan 8 acres, remainder Rajah and Gallipoli. As usual the Gluyas showed great freedom from disease. Barley, wild oats and one patch of mustard seen. The drilling was fairly good.

*Ross, A. E.*—An even crop of Bald's early with odd barley heads, but otherwise very free from weeds; disease below average. Drilling fair.

*Stewart D. & Sons* (No. I.).—Gallipoli 58/1. Heads well filled. Odd heads of Warden present; occasional mustard, barley and wild oats.

Loose and flag smut and one patch of "Take all". Missed strips in portion of the crop.

*Boettcher, F.*—Federation affected with patches of what may have been "Take all". Major not so badly affected, but burnt off and tipped on the flat. The whole of the crop was very well drilled.

*Stewart, D. & Sons* (No. II.).—Yield promised better than the No. 1 exhibit, but the varieties had been mixed.

*Parkinson, J.*—50 acres of Gallipoli and 70 acres of Canberra. Well filled heads with no tipping; wild oats in Canberra, othewise fairly free of weeds. No barley found.

*Hallet, J. J.*—Gluyas well headed but patchy; mustard and wild oats thick. Free from disease.

*Cox, T. E.*—Gluyas—bare patches prevalent. Wild oats, Cape weed, barley and mustard all found in small quantities.

*Ross, F. W.*—Ranee and Walker's Wonder. Purity above average. A lot of barley and mustard and occasionally barley grass. Severely attacked by "Take all". Strips missed by drill throughout.

*Jacob, W.*—Patches of "Take all". Tipped badly and many heads without grain especially on flat. A lot of mustard present as well as barley, sow thistles and Cape weed. The drilling was very good.

*Wiltshire, H. J.*—This crop failed badly, being dried off and tipped. Mustard was very thick and a fair number of sow thistles showed up. The crop was badly affected with ball smut.

## THE FALLOWS.

In the closing portion of 1925, although Murrayville was more fortunate than most other wheat-growing districts in regard to rainfall, the amount received was far below the average. In September 234 points fell, but in October, November and December, only 25, 43 and 4 points respectively were received.

It was to be expected then that the fallows, which were judged on the 3rd and 4th February, would be below the standard, and so they proved to be. Owing to the dry weather practically none had been worked since October, and the average number of workings for the fourteen exhibits was just under six.

The number of workings depends, to a large extent, on the date of fallowing, and it was noticeable that this was rather late for best results, averaging about early July. In the light of recent experience with summer fallow in other districts, Murrayville farmers would be well advised to make a test of fallowing carried out earlier in the year.

### The Competition.

Mr. F. A. J. Pahl scored first place with 91 points, Mr. E. A. Ross second with 90 points, and Mr. J. Parkinson third with 88 points.

Mr. Pahl has adopted summer fallowing and comparatively shallow cultivation. The fallow exhibited was "Wimmera," scarified to 2 inches in February; harrowed in March; scarified in June, and harrowed again. It was harrowed twice in July, and again in August to kill mustard; scarified and harrowed in September, harrowed in October, and finally scarified and harrowed in November.

The result was a very nice paddock with a somewhat light mulch, moisture very good at 6 inches depth, no weeds and a well prepared seed-bed.

Mr. E. A. Ross's fallow was not carried out until mid-August, when it was ploughed and afterwards harrowed; it was "combined" in early November, and harrowed, and portion "combined" again It had an attractive looking mulch of good depth; the moisture was good on the flats as well as the sand.

There were no weeds, but a few points were lost on the score of a somewhat uneven seed bed.

A fault in the ploughing more or less spoilt Mr. Parkinson's fallow as an exhibit—otherwise it was very well prepared and should stand to him well as far as crop is concerned.

**Awards.**

| Competitor. | Mulch. | Moisture. | Absence of Weeds. | Cultivation. | Totals. |
|---|---|---|---|---|---|
| **Possible Points** .. .. | **25** | **25** | **25** | **25** | **100** |
| Pahl, F. A. J. .. .. | 22 | 22 | 24 | 23 | 91 |
| Ross, E. A. .. .. | 23 | 22 | 24 | 21 | 90 |
| Parkinson, J. .. .. | 23 | 22 | 23 | 20 | 88 |
| Scott, R. S. .. .. | 22 | 21 | 22 | 22 | 87 |
| Micken, J. .. .. | 21 | 22 | 23 | 21 | 87 |
| Stewart, D. and Sons (No. 1) | 21 | 21 | 22 | 22 | 86 |
| Boettcher, F. .. .. | 21 | 23 | 20 | 21 | 85 |
| Jacob, W. .. .. | 21 | 23 | 21 | 20 | 85 |
| Stewart, D. and Sons (No. 2) | 22 | 20 | 21 | 21 | 84 |
| Ross, F. W. .. .. | 21 | 20 | 20 | 21 | 82 |
| Cox, T. E., and Arkins, H. F. | 21 | 20 | 17 | 21 | 79 |
| Hallett, J. .. .. | 20 | 20 | 18 | 18 | 76 |
| Job, A. .. .. | 20 | 20 | 17 | 17 | 74 |
| Hickford, C. H. .. .. | 21 | 20 | 16 | 17 | 74 |

## DAYLESFORD POTATO FIELD CROP COMPETITION.

*Report of the Judge, J. T. Ramsay, Potato Expert.*

Taking the crops entered, on the whole, the standard of cultivation throughout was very high, as was evidenced by the number of points allotted for cleanness and cultivation. The quality, too, was of fairly good standard, particularly in the case of one or two Carmen crops. The average weight of the crops, considering the adverse season which they experienced, was very good, working out as it does at 3 tons 16½ cwt. per acre.

One noticeable feature, which is well worthy of comment, was found on the property of Mr. Gooch, who had two entries, one in his name and one in his sons' name. The entry in Mr. Gooch's name was planted with

seed from the run of the crop, whereas his boys had gone to the trouble of selecting seed from heavy bearing plants for sowing the entry in their name. The land, for all practical purposes, growing both entries was the same, as was also the cultivation, and, I think, the rate of seeding. The returns from these were as follow:—

Mr. J. H. Gooch, from unselected seed, 3 tons 4 cwt. per acre.
Messrs. Gooch Bros., from selected seed, 6 tons per acre.

This is a very cogent illustration to the growers in the district of the benefit to be derived from the use of selected seed, a practice which the Department of Agriculture has most strongly advocated for years.

Results similar to these have been obtained on departmental demonstration and experimental plots in widely separated districts in Victoria. Last year at Millbrook, the main potato experimental station, five varieties were subjected to selective treatment, selected seed being taken only from plants which produced market-sized tubers at the rate of seven or over seven per plant. Parcels of selected and unselected seed of each of five varieties were planted side by side, and given the same manurial and cultural treatments, with the result that increases were produced in every case by the selected seed. The range of increase was from 25 per cent. in the case of the lowest to 45 per cent. in the case of the highest, the average being about 33 per cent. increase.

The fact that such a valuable illustration is brought right under the notice of the growers of the district shows forcibly the benefit to be derived by the society continuing to conduct these crop competitions yearly.

In conversation with the different growers, it was found that while the majority were using no manure, some were manuring at from 3 up to 6 cwt. of superphosphate per acre. During the past six years the Department has been conducting manurial trials on chocolate volcanic soil at Millbrook, which is not dissimilar to much of the Daylesford country. The results of these six years' experiences have amply demonstrated the need for applications of manure, principally superphosphate, but they have also clearly demonstrated that the optimum rate of manure sowing for that particular class of soil is reached at about 3 cwt. per acre, heavier dressings not being justified. It would, no doubt, be an excellent idea if the society would agree to the conduct of manure trials in the district, and it is probable that if application were made officially, the Department of Agriculture would agree to supervise these, so that correct data could be compiled. It would be necessary, of course, for the trials to be run over a series of not less than five years, in order that a fair average could be arrived at over the seasonal variations of that period.

One other point worthy of comment is that a wide variation in the distance between the rows was noticeable in the crops submitted for examination, this range being from 22 to 31 rows to the chain. Under no circumstances should the spacing between the rows be wider than 27 inches, which is equal to 29 rows to the chain.

During a period of 12 years' judging, it has been found that close spacing, both between the rows and in the row, gave not only an improved weight of crop, but there was also considerable improvement in the quality of the tubers.

This close planting applies to all classes of soil, and more especially to soils of the rich quality which abound in the district.

Just recently has been received a copy of a pamphlet issued by the Ministry for Agriculture for the north of Ireland, dealing with this subject, and giving the results of two years' trials at spacings of 27 inches between the rows, and 10, 15, and 20 inches between the sets in the row. In every case the 10 inches between the sets beat the 15 inches, and the 15 inches beat the 20 inches, and strong comment was made by the official investigator on the fact that the highest quality tubers were produced from the closest planting.*

The tendency amongst growers in Victoria in the past has been to plant sets either whole or cut which were altogether too small, with the result that the crops were handicapped at the outset through the sets containing insufficient nourishment to give the crop a decent start. A seeding rate per acre which is below 12 cwt., either cut or whole, is too light, and this could be increased with advantage up to 15 or 16 cwt. per acre.

## Details of Points Awarded to the Various Competitors.

| Grower. | Variety. | Evenness | Cleanness. | Quality. | Rows per chain. | Weight per chain. | | Acre tonnage. | Points for weight. | Total points. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Weight (large). | Weight (small). | | | |
| **Possible points** | .. | **10** | **10** | **35** | . | .. | .. | .. | **45** | **100** |
| | | | | | | lbs. | lbs. | T C. qr. | | |
| W. J. Stannage | Carman | 9 | 10 | 35 | 30 | 43 | 3 | 5 16 0 | 43 | 97 |
| Gooch Bros. .. | Snowflake | 9 | 10 | 31 | 28 | 48 | 2 | 6 0 0 | 45 | 95 |
| B. D. McKinnon | ,, | 9 | 9 | 30 | 28 | 46 | 7 | 5 10 0 | 41 | 89 |
| C. E. Williams | ,, | 9 | 9 | 30 | 28 | 43 | 5 | 5 7 2 | 40 | 88 |
| J. Rowe .. | Carman | 8 | 9 | 32 | 29 | 28 | 5 | 3 12 2 | 27 | 76 |
| T. McCormack | ,, | 8 | 9 | 32 | 27 | 30 | 7 | 3 12 1 | 27 | 76 |
| J. H. Gooch .. | Snowflake | 8 | 10 | 30 | 30 | 24 | 5 | 3 4 1 | 24 | 72 |
| A. Balharry .. | Carman | 8 | 9 | 33 | 31 | 19 | 7 | 2 12 2 | 19 | 69 |
| W. H. Curry .. | Snowflake | 8 | 10 | 30 | 29 | 20 | 6 | 2 10 3 | 18 | 66 |
| E. Geddes .. | Carman | 9 | 9 | 32 | 29 | 14 | 4 | 1 16 2 | 14 | 64 |
| J. A. Dougall | Snowflake | 8 | 9 | 31 | 22 | 20 | 7 | 1 19 1 | 15 | 63 |

In allotting the points for weight, the total number of points, viz., 45, is given to the heaviest yielding crop, the other crops receiving points for weight *pro rata*. As will be seen from the points allotted, Mr. Stannage's winning crop scored within 2 of the possible for weight, but secured the first place on account of the exceptionally fine quality of the tubers, which were given the maximum points for that, viz., 35.

* For further details see this *Journal* for May last.

# NATIVE INSECT PESTS OF THE ORCHARD AND GARDEN.

*By C. French, Jr., Entomologist, and G. T. Levick, B.Ag.Sc., Science Field Officer.*

## INTRODUCTION.

In the course of this article, which contains some of the entomological observations made by the senior author during nearly half a century, it is proposed to record the various native Victorian insects which have become economically important as pests of cultivated plants.

Some of these, for instance, the Apple Root Borer, have forsaken their natural food and attack the less hardy and more succulent introduced plants, others, such as the Cottony Cushion Scale, have become pests on introduced plants, but are even more serious on native trees reserved for shelter or ornamentation, the insectiverous birds and other enemies, which naturally kept them in check, having been driven back by the advance of civilization. It may be worthy to mention here the part that the English Starling plays in driving away our native insectiverous birds. The starlings follow man to the farthest edge of cultivation, and their numbers and aggressive habits enable them to take possession of all suitable nesting places, thus driving the native birds back into the bush.

Though some of the pests that will be mentioned have already been discussed in various articles, these have been included here in order that the record may be as complete as possible.

### I.—The Light-Brown Apple Moth.

(*Tortrix ashwarthana*, Newm.)

This is one of the native insects whose attacks on cultivated plants have been very severe. Its habits are very similar to those of the Codlin Moth in the orchard, but it is easily distinguished from the introduced insect at all stages of its life history.

The Light-brown Apple Moth larva has a remarkably wide range of food plants. Originally it lived on acacias of various species and other native trees, but there are now records of its having been found on apples, oranges, lemons, plums, apricots, peaches, mulberries, grape vines, and gooseberry bushes, and, in fact, practically every orchard plant. It attacks both the foliage and the fruit, and the injury to the apple is very similar to that caused by the better known Codlin Moth.

Besides orchard trees, almost all garden plants are devoured by the larvae, and the insect is sometimes a serious pest in the glass house.

#### Life History.

The eggs are laid on the leaves and fruit of the host plant, and on hatching the young larvae commence to eat the epidermis of the foliage, or, if on an apple, to burrow into the core. On plums and other stone fruits, the larvae eat grooves in the skin, generally near the stem, but do not tunnel. The larvae of this moth are able to fasten the leaves of the plant together by means of webbing, and one or more live sheltered within, coming out occasionally to feed. When disturbed the larvae are

[From French's Handbook of the Destructive Insects of Victoria, Part I.

**Plate I.—Light Brown Apple Moth** (*Tortrix ashworthana.*)

## PLATE I.—LIGHT-BROWN APPLE MOTH
(*Tortrix ashwarthana*).

Fig. 1. Apple branch and fruit, showing damage done to pips, with larvæ escaping. Natural size.

Fig. 2. Moths on wing. Natural size.

Fig. 3. Upper portion of apple when newly formed, showing where eggs of moth are deposited.

Fig. 4. Larvæ (or grub). Magnified.

[From French's Handbook of the Destructive Insects of Victoria, Part III.

**Plate II.—Painted Apple Moth** (*Teia anartoides*, Walk.).

## PLATE II.—THE PAINTED APPLE MOTH
(*Teia anartoides*, Walk.).

Fig. 1. Apple branch, showing larvæ in various stages. Natural size.

Figs. 2 and 3. Perfect insect, male. Natural size.

Fig. 4. Perfect insect, female. Magnified.

Fig. 5. Cocoon, eggs, and perfect insect (female). Natural size.

Fig. 6. Perfect insect, female, dorsal view. Natural size.

Figs. 7, 8, and 9. Pupæ of male. Natural size.

[From French's Handbook of the Destructive Insects of Victoria, Part IV.

**Plate III.—Huebner's Case Moth** (*Thyridopteryx Huelneri*, Westwood).

## PLATE III.—HUEBNER'S CASE MOTH
(*Thyridopteryx Huebneri,* Westwood).

Fig. I. Twig of eucalyptus, with cases constructed of silk and dead leaves. Natural size.

Figs. II. and IIa. Cases or bags containing larvæ. Natural size.

Fig. III. Larva. Natural size.

Fig. IV. Pupa, male. Natural size.

Fig. V. Pupa, female. Natural size.

Fig. VI. Perfect insect, female. Natural size.

Fig. VII. Perfect insect, male. Natural size.

Fig. VIII. Hymenopterous insects, parasitic on larvæ and pupæ. Natural size.

Fig. VIIIa. Cocoon of hymenopterous insect. Natural size.

very active, and will drop on a thread to the ground in a second. The full grown larva is greyish green in colour, about three-fourths of an inch in length, and pupates within its leaf and webbing shelter.

The adult is a small moth; the females are about three-fourths of an inch across the wings; the males are smaller. They are light-brown in colour, the fore wings being lightly barred with darker brown; the markings are variable.

CONTROL.

The arsenate of lead spray as used for Codlin Moths (1½ lb. of paste in 25 gallons of water) is quite effective, but broods of the Apple Moth appear later than the Codlin, necessitating rather late spraying. It is recorded as attacking apples as late as April, and garden plants practically all the year round.

## 2.—The Painted Apple Moth.

(*Teia anartoides*, Walk.)

The hairy, brightly-coloured larva of this moth is often a somewhat serious pest on various plants.

The Black Wattle was apparently at one time its favorite food, but it now thrives on many orchard trees, as apples and cherries, on hawthorn hedges, and on such garden plants as roses, asters, dahlias, carnations, marigolds, and chyrsanthemums. Some years ago (June, 1918) a number of cabbages and cauliflowers were attacked by Painted Apple Moths at Caulfield, near Melbourne; this indicates the wide range of its food.

LIFE HISTORY.

The eggs are numerous, up to about 700 being laid by a single moth. As the female is wingless, and sluggish in her movements, the eggs are laid in a mass, generally over the cocoon from which she emerges.

When the eggs hatch, the large brood of little black hairy caterpillars immediately begin eating the epidermis of the leaves, spreading over the tree and skeletonizing the leaves as they grow.

When full grown the caterpillar measures about 1¼ inches in length; it is clothed with fine hairs, and there are two loose tufts of rather longer hairs near the head, one near the tail and four blocks of somewhat dense short hairs in the middle of the back. The head is of a reddish-brown colour, and the body is marked with velvety yellow, brown, and red. The larva spins a loose, flimsy cocoon of silk, and pupates within.

The adult female is about half an inch in length and of a light-brown colour. Unlike the female, the male is winged, the wings being about an inch across, and very prettily coloured in dark-brown, yellow, and grey. The fore wings are dark-brown with greyish markings, the hind wings an orange yellow, with broad dark-brown band on the outside, fringed along the outer margin with yellow.

CONTROL.

Spraying with arsenate of lead will keep this pest in control. There are also hymenopterous parasites which form a natural control, so many being parasitized that, in some years, it is a matter of difficulty to rear a moth.

### 3.—Huebner's Case Moth.

(*Thyridopteryx huebneri*, Westw.)

The native food of this remarkable insect is rather diverse. It is commonly found on various species of Eucalyptus, Leptospermum, and Melaleuca, but there are few plants on which it will not feed, and use in the construction of its case. In 1914 it was a serious pest on grape vines and quince trees, and its extraordinary range of food is indicated by the fact that some of the moths were found feeding on rhubarb at Sale last year. It has also proved a very serious pest in pine plantations, being extremely numerous near Castlemaine in 1925.

During the present year some larvae of this case moth were forwarded from Gippsland, where they were attacking the blackberry brambles, the person who sent them asking whether in view of that they were worth protecting.

The numbers in which these insects appear may be gathered from the fact that on a single branch of coastal tea-tree (*Leptospermum*) about 15 inches long, we counted over 75 of the cases.

#### Life History.

The eggs are laid by the female from the end of its case. On hatching the young larvae lower themselves by a silken thread to lower parts of the plant, and each immediately begins feeding and constructing its case, in which the larva pupates. On different plants there is a great variation between the cases made.

In appearance the sexes differ very much. The male is a small moth with a brown hairy body and transparent wings. The female remains permanently within its case, and is quite degenerate, being without appendages of any sort except rudimentary legs.

#### Control.

Spraying the plants with arsenate of lead is a very efficient remedy. Where this is not practicable, as in a young pine plantation, torches may be used to set fire to the cases, which having the dry needles built into them will burn readily.

Fortunately, they have many natural enemies, as *Tachnid* (*Diptera*), and several species of *Ichneumons* have been reared in large numbers from these case moths on various occasions.

(*To be continued.*)

# PRUNE AND PLUM CULTURE.

(*Continued from page 270.*)

*By J. M. Ward, Superintendent of Horticulture.*

## Harvesting and Packing.

The success of the grower in marketing his product depends largely upon the method of harvesting and packing. As the treatment for prunes and plums is essentially different, it will be necessary to deal with each in turn.

### PRUNES.

Prunes for drying purposes should be much more mature when picked than plums intended for the fresh market, as a greater loss of

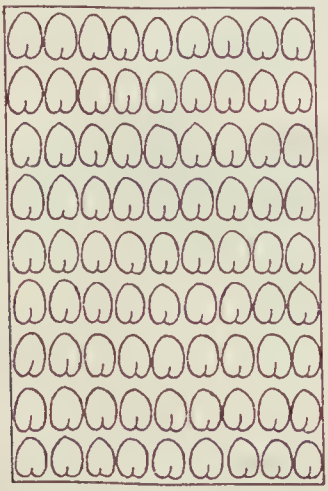


**Fig. 69.—Showing Method of placing the prunes on the bottom of the case (which will eventually become the top). Only one layer need be placed in position, the additional prunes to fill the box being simply filled in.**

weight occurs in the process of drying if the fruit is not allowed to become thoroughly ripe before harvesting. The thorough ripening of the prune permits it to develop the maximum of sugar. Further, the gathering of the fruit may then be facilitated by shaking it on to sheets of hessian or other material.

### PACKING OF PRUNES.

Prunes are usually packed in boxes containing 28 or 56 lb. Attention to a few details will make a considerable difference in the appearance of the fruit when placed on the market.

The method of packing the dried prune is quite simple, and well worth the small amount of trouble involved. Commence in the usual way by lining the case with white lining paper, then place one layer of prunes in the bottom of the box as shown in Fig. 69. When this has been done, simply fill the box with the correct weight of prunes,

place it under the press, and nail on the lid. Then invert the box, and the attractively packed bottom layer becomes the top, and when opened to the buyer, the case will present an attractive appearance.

### Plums.

Plums should remain on the tree until they have fully developed and attained their characteristic colour. With different varieties the stage may vary somewhat, according to certain trade requirements. The fruit should, however, be picked before it commences to lose its firmness; in other words, when it is large enough, firm enough, and coloured enough. Exceptions to this rule, of course, occur. For instance, the grower of Wickson plums would not wait until the fruit had turned red before picking, but would start when it is yellow, and before the points commenced to change to red; but varieties such as Satsuma, or some of the European sorts, should remain on the tree until the colour has fully developed.

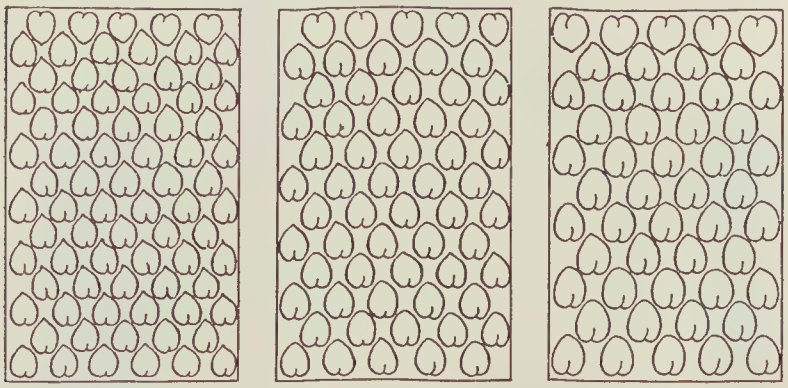



**Fig. 70.—Illustrating the manner in which plums are placed in the trays. The method is the same for both the Australian and American trays; the number of plums in each will, however, vary.**

(Note.—The last plums in each layer are reversed so as to protect the points of the fruit from being damaged by the end of the tray.)

Care should be taken to see that the stalks remain intact on each plum, and to avoid, as far as possible, the rubbing off of the natural bloom of the fruit.

To growers who contemplate exporting their plums, such details as protection of the natural bloom, retaining the stalks on each specimen, maturity, colour, and size of the fruit should not be overlooked, as these are important details.

As with other fruits, a good system of picking is necessary, and the fruit handled with every care. The trees should be gone over two or three times during the season. This will permit of the larger and more mature fruit being removed, to the advantage of the smaller and immature fruit, which will quickly develop after the former is harvested. A good method is to pick the fruit systematically from each branch, commencing at the base, and working upwards. Scrambling all over the tree will then be avoided, and less fruit knocked off.

### PACKING OF PLUMS.

If plums are to be packed for export, there is no doubt that the tray containing the single layer of fruit is the most satisfactory package, and if we are to compete with foreign trade on the London market, plums under $1\frac{3}{4}$ inches in diameter should not be exported. The trays must not be lined with paper, as this tends to prevent free circulation of air around the fruit. A thin layer of wood-wool should be spread on the bottom of the tray, and each plum wrapped separately in tissue paper, and packed on their "cheeks" on the 6-5, 5-5, or 5-4 diagonal system of packing. The points of the plums should face the same direction, excepting the last plums; these should be reversed to protect the delicate points of the fruits from touching the end of the tray (see Fig. 70).

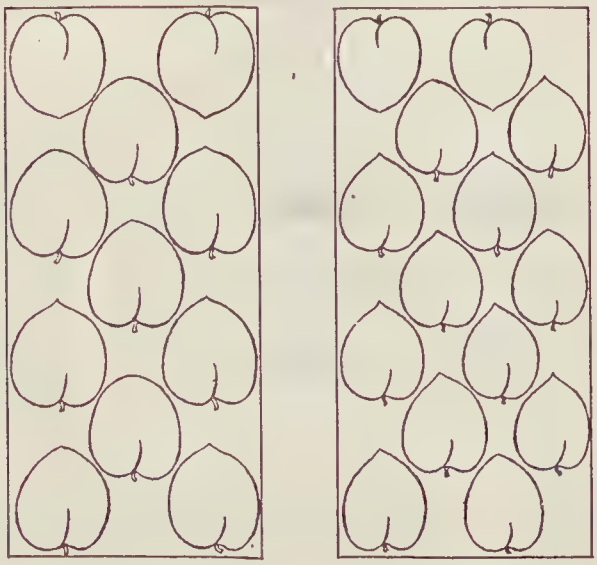



**Fig. 71.—Showing method of packing the first layer of 2-1 and 2-2 packs.**

NOTE.—The last fruits in each layer should be reversed so that the point of the plums will be protected. Fruit in the second and succeeding layers rest in the pockets or spaces formed by the fruit beneath.

A very important feature is to see that the plums in each tray are of equal size and of uniform quality.

When the layer is complete, it should be "snug" and firm, and not have any loose plums that will roll about. No wood-wool whatever should be placed between the fruits. All that is necessary is that a layer of wood-wool be put on top of the fruit, and the lid nailed on. It is recommended that each tray be "lidded" separately, and the fruit dispatched in single trays, instead of several trays being cleated together, as is sometimes done.

A very suitable container for the export of plums is the American or South African tray. Its internal measurements are $11\frac{1}{2}$ x 17 x $2\frac{1}{2}$

or 3 inches, according to the depth required. After the lid has been placed on the tray, a narrow cleat is also nailed across each end of the lid; this will create an air space between each tray when they are stacked on top of one another.

For the benefit of those desiring to pack in this kind of tray, the following measurements will indicate in what sizes the necessary timber should be cut at the saw-mill:—

Lids and bottoms, cut 3-16 x 18 x 5⅜ inches.
Side pieces, cut 3-16 x 18 x 3 inches.
Ends, cut ½ x 11½ x 3 inches.
Cleats, cut ⅜ x ½ x 11½ inches.
(Each tray has a two-piece lid and bottom.)

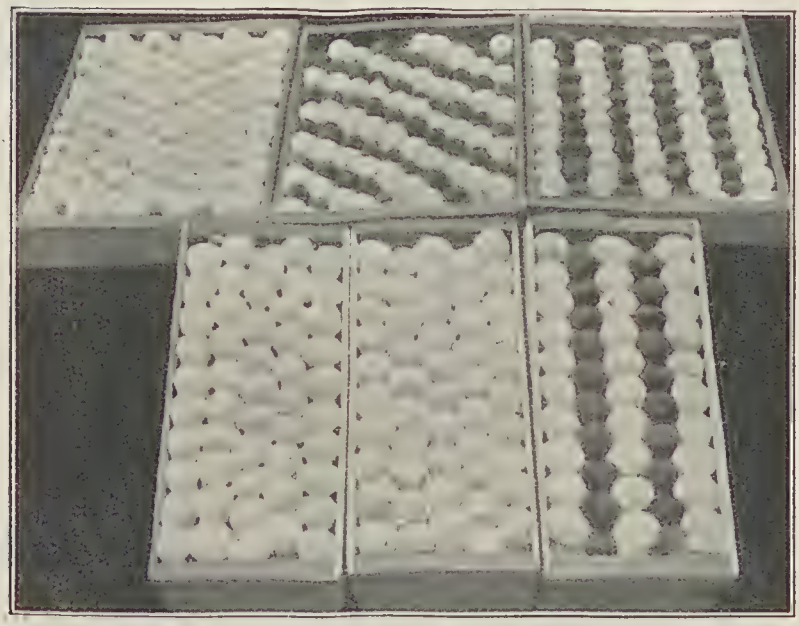


**Fig. 72.—Plums packed for oversea export in single-layer trays, and in half bushel cases for the Australian trade. Some fruit wrapped and some unwrapped.**

The following table gives some of the packs suitable for adoption in this tray:—

| Size. | Pack. | Layer. | Number of Layers. | Total. |
|---|---|---|---|---|
| 1¾ inches .. .. .. .. | 6–5 | 5 × 5 | 1 | 55 |
| 2 inches .. .. .. .. | 5–5 | 5 × 5 | 1 | 50 |
| 2⅛ inches .. .. .. .. | 5–4 | 5 × 5 | 1 | 45 |

The inside measurements of the Australian tray are 18 x 14¼ x 2½ or 3 inches, according to the depth required.

Plums for the local market should be sized as evenly as possible, and uniformly graded, that is to say, the plums in a case should be of similar quality; on no account should any soft or ripe plums be packed with the hard ones, or the result will be a slack pack and many squashed plums.

The "Long" bushel case (26 x 6 x 14¼ inches, inside measurements) is generally used for local trade. In this case, large varieties, such as Ballena, Wickson, Ponds, Grand Duke, &c., should be packed either on the 2-1 or the 2-2 "diagonal" method. Packed in this way they not only carry better, but present a more attractive appearance when the side is taken off, and the case opened to the buyer.

The method of commencing the 2-1 (two-one) and 2-2 (two-two) packs is shown in Fig. 71, and, as in all other packs for plums, the last plums in each layer should be reversed to protect the point of the fruit from damage against the end of the case. The second and succeeding layers are packed in exactly the same manner as the first layer, except that the first plums are commenced over the spaces or pockets caused by the fruit beneath, and not directly on top, thus no two fruits rest directly on top of each other in any direction.

The fruit should be packed slightly above the top of the case (about ½ inch), so that it will be quite firm when the lid is nailed on. Slack packing of plums is fatal.

*(To be continued.)*

# THE HORN-TAILS.

## A TIMBER PEST.

*By G. T. Levick, B.Ag.Sc., Science Field Officer.*

A recent proclamation under the *Vegetation and Vine Diseases Act* 1915 has declared all members of the family *Siricidae* to be insects for the purposes of the Act. These insects, commonly known as "Horn-tails," are wood-boring wasps, and odd specimens have been brought to this country now and again during many years. Lately, however, the attention of departmental officers was drawn to the large numbers arriving in shipments of timber known as "white deal," from Dantzig, and, following on a recommendation from Mr. French, Government Entomologist, the *Siricidae* family was added to the list of those insects to which the Vegetation and Vine Diseases Act applies. Since then all timber showing evidence of the borer has been seized by quarantine officers, and either treated under supervision or burnt.

It is hoped that by these methods the introduction of the insects in any number may be prevented where it might do immense damage to our pine plantations and ornamental trees. Although one or two specimens have been recovered after having bored their way out of timber built into houses, there is no evidence that these wood-boring wasps have as yet become established here.

"Horn-tails," which are so-called on account of the rather conspicuous horn-like projection from the last abdominal segment, are

widespread in a large portion of the Northern Hemisphere; they are well-known pests in Europe, the British Isles, and America.

The adults measure up to 2 inches across the wings, and possess rather stout, cylindrical bodies. In colour the different species vary—some are black, some metallic blue, and others striped with yellow or brown.

The females bear a long and powerful ovipositor, often as long as the rest of the body, with which they are able to pierce timber to a depth of nearly half an inch; in this cavity they deposit their eggs. The eggs are laid singly, and the larvae, on hatching, bore into the heartwood, sometimes doing considerable damage.

[Drawn by G. T. Levick.

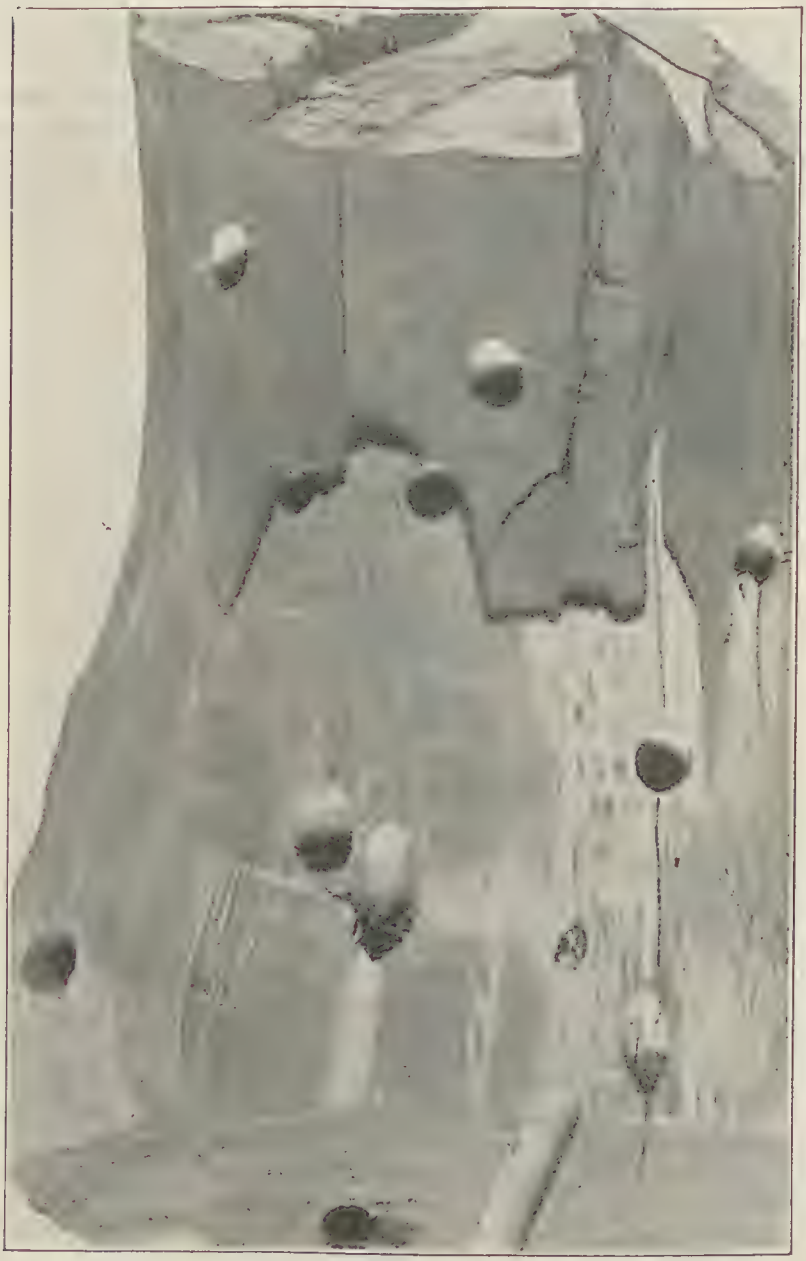
**A Horn-Tail (*Sirex gigas*) Adult and larva (one and half times natural size).**

When full-grown the larva is a creamy yellow grub, about $1\frac{1}{4}$ inches in length, with reduced thoracic legs. It bears a spine at the end of the abdomen, which seems to assist in locomotion.

The larva pupates inside the tunnel, generally fairly close to the surface; this facilitates the exit of the adult. While the larva does most of the tunnelling the adult can also bore, and with remarkable rapidity. The life cycle of the horn-tails extends over about two years. Occupants of houses which have been built a year or more are sometimes dismayed by one of these formidable-looking wasps boring its way out of the floors or walls. There is no danger, however, of their breeding in houses, as they will deposit eggs only in living or freshly-felled timber.

A case recently brought under notice illustrates the remarkable boring power of the adult when the time comes for it to emerge. The

core of wood around which a roll of tweed was wound evidently contained the larva of one of these wasps, and on reaching the adult stage,



**Timber bored by Horn-Tails.**

it began to bore its way out, and tunnelled through the cloth, perforating every fold.

# MAIZE EXPERIMENTS.

## Improving Yields in Victoria.

Three definite problems are recognized, viz.: methods of improving the yields on the river flats where maize growing for grain is an established industry; the extension of the maize area to the lighter and more sandy soils in eastern Gippsland; and finally, the perfection of methods of growing maize on the hill country in Gippsland. The latter is regarded as the most difficult problem, as there, owing to the colder conditions, the maize cannot be depended upon to regularly form cobs.

It was decided to attack the least difficult problem first, as in this way the best use could be made of the existing resources of the Department of Agriculture. Accordingly, an experimental field was laid down at Lindenow to improve maize varieties, and to determine whether manure could be profitably applied to the crop.

Problems, such as the best method of spacing the rows, the number of seeds per hill, rotations for maize, and so on, were set aside for investigation later.

Already the work at Lindenow, especially the variety tests, is showing results. It would appear that there are considerable differences between the productivity of the strains of maize grown throughout the district. The object of the test is to discover which of these strains, over a period of years, give the best average yields. In the plots, a strain which had been selected for many years by Messrs. Telfer Bros. has shown itself very prolific. It is one which appears to be worthy of being sown on a larger scale than at present; but no definite pronouncement on the subject will be made until the results of this year's harvest are available.

The variety tests should, during the course of a few years, demonstrate which of the local varieties and strains of varieties are most prolific. When that has been determined to the satisfaction of all concerned, an effort will be made to induce growers to adopt a uniform strain.

There is no doubt that, so long as a large number of varieties, some prolific and some not so prolific, are grown in the district, the promiscuous cross-fertilization which eventuates is to the detriment of the high-yielding strains.

The Department is importing four strains of maize from America. These, after being grown in quarantine, will be tried side by side with local varieties, precaution being taken, of course, to grow some of the seed in isolated positions elsewhere so that the purity of each strain will be maintained. However, it is believed to be quite likely that the best local strain which has been selected to suit the requirements of the district will prove superior to anything that may be imported.

The results of the manurial experiments with maize indicate broadly that it is likely to pay to liberally manure the maize crop on the river flats with dressings of superphosphate, and possibly with some nitrogenous fertilizer, such as ammonium sulphate. However, the experiments have not been conducted for a sufficient length of time to warrant

any deduction being made as to the exact quantity of these manures which is most profitable. To determine this is the object of the test, and there is no doubt that during the next year or two a comprehensive set of exact data will be available for the growers as a result of the work at Lindenow.

Although the experiments do not include any cultivation tests, maize-growers should not overlook the importance of careful and early preparation of the land upon which the maize is to be sown. Experiments in New South Wales, conducted at the Grafton Experiment Farm for a period of five years, indicate that where the maize field is ploughed in June, it gives an average increase of 12 bushels 17 lb. of maize per acre above that obtained where the crop is sown on September-ploughed land.

Maize-growers at Lindenow realize in a general way that early ploughing pays; but if they were to appreciate this fact to its full value, no doubt they would make a special effort to graze out the harvested maize fields promptly by crowding on stock, and then discing in the stalks and working down the land.

The continued cropping of maize on the river flats at Lindenow is undoubtedly slowly lowering their fertility, and the time is fast approaching when maize-growers will find it profitable to institute a rotation system under which some other crop than maize is systematically interposed between every few maize crops. The ideal crop for this would be a leguminous forage crop, which, besides restoring humus to the soil, will supply nitrogen.

It is hoped later to undertake experimental work at Lindenow to determine the best crop for this purpose. A means of restoring fertility to the land, and one which would not interfere with the present methods much, would be to sow in the maize crop before it is ripe some form of forage crop which, though it would make slow growth before the maize was harvested, would afterwards come on rapidly and furnish forage for sheep. Of course, usually a plentiful supply of grass and other feed appears between the maize during winter; but it is quite possible that there are other plants, such as rape, berseem, &c., which may fill the bill better.

## WONDERFUL VICTORIA.

In the midst of its troubles with fires, Victoria sends out this little memo. of what she produces:—Thirty-six per cent. of Australia's butter; 33 per cent. of Australia's manufactures; 29 per cent. of Australia's wheat; 22 per cent. of Australia's fruit; 15 per cent. of Australia's wool. And yet Victoria covers but 3 per cent. of the continent! A wonderful State, indeed.—*Queensland Live Stock Bulletin.*

# THE BROOM FIBRE INDUSTRY.

Prior to 1925 portion of the fibre used in the manufacture of "American" brooms in Australia was imported from Italy; but some of these consignments were found to be infested with the European Corn Borer, an insect which has caused extensive damage to maize, millet, and other crops in the United States of America and Canada.

In order to prevent the introduction of this pest into Australia, the Commonwealth Government prohibited the importation of broom millet, and recently, in an effort to have the embargo lifted, manufacturers stated that it was impossible to obtain locally adequate and regular supplies of what is termed "long hurl fibre," i.e., fibre exceeding 24 inches in length. On the other hand, the growers averred that they could produce all the fibre required by the trade, and strongly protested against any proposal to remove the embargo.

With a view to bringing the growers and manufacturers together, and in this way ascertaining the requirements of the manufacturers and the ability of the growers to meet them, the Director of Agriculture, Dr. S. S. Cameron, recently suggested that both parties should meet in conference, and a meeting was held at the offices of the Department of Agriculture, which was attended by Messrs. Mitchell, Wallace, and Wilks (representing the manufacturers), Messrs. Bradley, Peipers, and Wood (representing the growers), Mr. H. A. Mullett (Superintendent of Agriculture), and Mr. Temple A. J. Smith (tobacco expert).

At this meeting the manufacturers definitely made known to growers their requirements as to quantity and quality of each grade of fibre, and the Victorian Broom Growers' Association undertook to grow and market fibre conforming to the requirements.

A standard specification for parcels of broom millet was drawn up, and it was agreed to market the whole of the growers' output by auction at a central dépôt in Wangaratta. It was decided that disputes as to the quality of parcels marketed should be referred to a committee representing the growers, the manufacturers, and the Department of Agriculture, this body being empowered to draw annually standard samples for reference.

The following resolutions were agreed to:—

(1) *Specification of Unit Parcel*—

That this meeting of broom growers and manufacturers agrees that broom fibre shall be marketed on the basis of what is known as a "self-working parcel."

A self-working parcel shall consist of 40% "long hurl," 25% "covers," and 35% "insides" (these proportions not necessarily contained in each bale).

"Long hurl millet" to consist of good clean, sound fibre, not less than 24 inches in length, stalks not to exceed 4 inches.

"Covers" to consist of good, clean, sound fibre, not less than 18 inches in length, stalks not to exceed 4 inches.

"Insides" to consist of good, clean, sound fibre, not less than 6 inches in length, with stalks 8 to 10 inches.

All millet must be well threshed and securely baled.

All inferior millet to be baled separately. The term "inferior" covers coarse, curly, weather-stained and damaged millet.

(2) *Standard Bale*—

"After one year's grace, the whole of the millet to be marketed in uniform bales, specifications of which are to be subsequently agreed upon."

(3) *Method of Selling*—

"Fibre to be sold under the hammer at a dépôt in Wangaratta, 10 per cent. of each grower's lot to be shown as a sample.

The Association will endeavour to see that each sample is representative of the bulk.

In the event of any dispute arising as to the bulk being up to sample, a committee consisting of equal numbers of representatives of the growers and manufacturers, respectively, and an officer of the Department of Agriculture, to be appointed to settle such dispute, by reference to the standard sample.

Sales to take place during the first week in June and the first week in August."

(4) *Standard Sample*—

"Representative samples, consisting of 18 heads of each 'long hurl,' 'covers,' and 'insides,' to be drawn immediately by representatives of the growers, the manufacturers, and the Department of Agriculture—such samples to be divided into three parts, and one part lodged with each party for reference.

The samples to form the basis of sales each season to be drawn from the current year's crop by representatives of the three parties above mentioned."

It was stated by manufacturers' representatives that their annual requirements of fibre are in the vicinity of 400 tons.

The manufacturers could give no guarantee to purchase supplies only through the Association, as they felt they had obligations to a few growers who might not be willing to become members of the Association. However, they were willing that it should be understood that they intended to purchase the whole of their requirements through the Association, and as far as possible they would endeavour to adhere to that principle.

With a view of assisting growers to improve the quality of their product, the Department of Agriculture proposes to undertake some experimental work in the broom fibre districts. Already a large number of samples of high-grade broom corn have been gathered for trial later in the year in test plots, which will also include manurial experiments, time of fallowing, and rate of seeding tests.

The sowing only of broom corn which has been subjected to repeated selection for length and quality of fibre is urged upon growers, as well as the liberal application of fertilizers, and early and thorough cultivation of the soil upon which the broom corn is to be grown.

# PROFIT IN MILK PRODUCTION.

## Importance of the Last Two or Three Gallons—When to Feed Liberally.

That the possible chance of profit in milk production lay in the last 2 or 3 gallons was the opinion expressed at a meeting in Cheshire on Tuesday week by Mr. R. Mercer (principal of the Reaseheath School of Agriculture). He said the question was sometimes asked whether it paid to feed 20 lb. of corn a day to a cow giving 5 gallons of milk. His reply was that in the last 2 or 3 gallons lay the profit. It cost 1s. a day to keep a cow at all, this, of course, being an approximate figure. The cow giving 1 gallon a day would cost 1s. plus 3 to 4 lb. of corn, which might be reckoned at 4d. Milk at the present time was fetching round about 1s. 4d. on the farm, and so the 1-gallon cow was just holding her own without allowing anything for depreciation, &c. The 2-gallon cow cost 1s. plus 8d. for corn, or a total of 1s. 8d., to which must be added another 8d. for depreciation and the cost of milking. That made 2s. 4d., and so there was even yet very little possibility of profit. The 5-gallon cow cost 1s. a day precisely like the others, plus 1s. 8d. for corn, plus 8d. for depreciation and milking like the others, or a total of 3s. 4d., against which there were 5 gallons of milk worth, say, 6s. 6d., and so the only chance of profit lay in the cows above the 2-gallon line, and the higher above that line the better the profit, provided the cow was fed rationally.

### The Time to be Liberal.

The question also arose as to whether the cows received the quantities of corn they needed to produce the milk they were capable of producing. Unless owners drove themselves to do it, he ventured to say that it was very rarely done; they very frequently cried ca'canny just at the moment when they ought to have been most liberal. It was admitted that if they took a cow that had calved six months and had got down to the 2-gallon or 1½-gallon line, they were up against it if they wanted to increase her yield. But if they took a cow which had been calved a month, they could raise her yield or make her hold her own by feeding properly. The wise man spared no expense to help her to the limit, although he might seem to be feeding her heavily. When it was said that cows should be fed according to their milk yield, it would appear logically that a dry cow would require no corn at all, except possibly a small allowance for the formation of the calf.

### The Result.

But how did this work out? It meant two months' poor rations with the cow carrying a calf—and the calving, a violent sudden strain upon her system. Thereupon a sudden accession of corn—a sudden and violent strain upon her digestion, for which she was unprepared; was this fair if they were to expect the best results? He tried an

experiment in this connexion some fifteen months ago with fourteen heifers, apparently an even lot, calving at various times between November and January. Seven of them were fed with corn prior to calving, and the other seven were left without. The corned lot in the first sixteen weeks of their lactation gave, on an average, 20 gallons more of milk than the others. And so it would appear that the steaming-up, as it was called, had a material effect upon the subsequent yield.

—*Farmer and Stockbreeder,* England, 26th January, 1926.

# ORCHARD AND GARDEN NOTES.

*E. E. Pescott, F.L.S., Pomologist.*

## The Orchard.

### PRUNING.

Pruning operations will now be in full swing. In pruning the young trees, heavy pruning will be required in order to produce strong growths and a good frame, but as the tree advances in age the pruning will be reduced considerably. It should be remembered that strong, heavy pruning results in wood growth, and that weak pruning steadies the tree, and promotes an even growth. When framing and building a tree, the former consideration is observed, and when the tree is coming into fruit bearing or is mature, it will be pruned according to the latter. Any operation that will cause the tree to produce less wood growth will induce the tree to become more fruitful, provided the tree be in a healthy condition; so that when trees are mature, pruning operations, as a rule, should not be severe, but rather the reverse.

Old fruiting wood, and dead and dying wood should always be removed, and aged spurs should be considerably reduced, in order to make them produce new growths. Crowded and overlapping laterals should be shortened back; fruit-bearing in the higher portions of the tree should not be encouraged; and due consideration should be given to the admission of light and air to all parts of the tree.

Where varieties of fruit trees are prone to bearing crops every second year, their lateral system should be pruned so that they will not produce too heavy a crop in the fruiting year; and at the same time they will produce wood in their fruiting year to give a crop in the subsequent season.

A model tree will always be light on its topmost leaders, bearing the major portions of the crop in the lower regions of the tree. The main point to be noted is that a heavy wood growth in the upper portion of the tree tends to reduce the bearing capabilities of the tree in its most useful parts.

## Drainage.

The rains of winter will always show the necessity for draining orchards. Where under-soil drains do not exist, the trees are bound to suffer. If the damage is not immediately apparent, it will be later found that in some way loss will accrue. Either the tree will be weakened by the loss of roots through rotting, or it will be devitalized so that it will not carry a satisfactory crop of fruit. Too often surface drainage is relied on to remove the so-called surplus water. There should be no surplus water for surface drains. The water is only surplus or excess when it is in the soil. Two circumstances, and two only, permit of surface drainage. First, when it is necessary to carry away excessive stormwater; and, second, when it is practically impossible to find an outlet for under-drains, owing to the low-lying situation of the area.

The term "surface drainage" does not apply to open drains, which, owing to their depth, act also as soil drains; neither does it apply to graded surfaces which allow a more equitable distribution of water. Surface draining is usually applied to a system, whereby a considerable quantity of water is removed by gravitation before it enters the soil. Such a system cannot be too roundly condemned. As much water as can be obtained by natural means should be induced to enter orchard soils; and then whatever is in excess will be carried away by under drainage, provided that drainage, either natural or artificial, be in existence.

Where suitable drainage is not provided, the tree roots are compelled to remain in a few inches of surface soil. Their feeding area is thus extremely limited indeed; and when, at any time, rain-water does filter and penetrate through the soil, it carries with it the soluble and other plant foods, below the reach of the tree roots.

Soil ventilation is only possible with a system of drainage, and air is as necessary to the roots of a tree as it is to the foliage. By the removal of the surplus water and the consequent admission of air into the soil, the soil temperature is rendered far more equable, warmer in winter and spring, and cooler in summer; and such a change must be beneficial to the trees.

Drainage is thus an essential for all orchard lands. When natural drainage occurs, the orchardist is fortunate; but whether natural or artificial, a system of drainage will always materially increase the crop of fruit, strengthen the trees, and considerably add to their term of life.

Drainage schemes should be carried out at the present season of the year. In closed drains, such drainage media as cinders, charcoal, stones, brushwood, timber, logs, or tile pipes may be used, but the latter generally give more satisfactory and permanent results. They are also less liable to silting up than any other material.

Drains should be placed into the clay, if this be not too deep. In any case, they should be below any possible interference from cultivating instruments.

### SPRAYING.

In order to keep in check such pests as Bryobia, scale insects, woolly aphis, and others, a strong and forcible spraying with lime sulphur, nicotine—sulphate or red oil spray should not be delayed any longer. The whole tree should be thoroughly wetted with the spray. A good, vigorous, and thorough winter spraying will place a large majority of the trees in quite a satisfactory condition of freedom from these pests for the whole year.

The lime sulphur spray is an excellent fungicide, and a strong winter spray will go a very long way in reducing any attack of the black spot fungus on either the apple or the pear. In addition, if the peach trees are sprayed at this time with lime sulphur, both peach aphis and peach leaf curl will be considerably minimised in the spring time.

## The Flower Garden.

Digging in the garden should be continued. Before digging, the beds should be given a top dressing of lime or stable manure, and subsequently these should be dug well into the soil. Care must be taken not to injure the roots of any shrubs, trees, or roses. Root cutting and root pruning will always dwarf any plant. In digging, it is not wise to discard any leaves, twiggy growths, or weeds. Unless they are required for the compost heap they should always be dug into the soil. Leaf-mould is especially useful in any garden, and where such plants as Azaleas, Rhododendrons, Paeonies, Liliums, &c., are grown, or for pot-plant work, it is exceedingly valuable. In forming the compost heap, no medium whatever should be added to help the rotting down of the leaves unless it be a little sand. Any chemical added will render the mould unsuitable for its special objects. The plants mentioned above strongly object to lime.

All shrubs that produce flowers on their young growths, including roses, should now be pruned. Care should be taken to distinguish between those shrubs that flower on the new wood and those that flower on the wood of the past season's growth. Those that flower on the new wood, and may now be pruned, are Lantana, Cestrum. Tecoma, Hydrangea, Plumbago, Erythrina (some species), &c., and those that should not be touched at present time are Spirea, Erythrina (some species), Pyrus Japonica, Weigelia, Prunus pissardi, P. Vesuvius, P. mume, Deutzia, Polygala, Ceanothus, &c. It is a safe rule in pruning shrubs to wait until they have flowered before pruning. This will certainly give the shrubs a somewhat ragged appearance in the winter, but it is the only way to secure the best flowering results.

All herbaceous plants, such as Salvia, Aster, Delphinium, Polygonum, Boltonia, Gaura, and Chrysanthemum, should be cut back, and, if necessary, lifted and "heeled in" in a temporary location for the winter. Plant out early Gladioli, Iris, and Liliums.

Continue digging, manuring, and trenching.

### The Vegetable Garden.

Seedlings from boxes or seed plots may now be planted out. Care should be taken that all vegetable beds are well raised and thrown up. By throwing up the soil, and thus deepening the paths and the spaces between the plots, the latter are well drained, and the soil is made considerably warmer. This will greatly facilitate the growth of the young plants.

Asparagus may be planted; sow seeds of carrots, parsnips, cauliflowers, onions, peas, broad beans, and tomatoes, the latter being forced on in a frame, so as to obtain good plants quickly.

## REMINDERS FOR AUGUST.

### LIVE STOCK.

HORSES.—The feeding and general management of horses recommended for July will also apply for this month. Horses, more especially young ones, running on low-lying country are liable to become affected with internal parasites. This will be recognised by the unthrifty and poor condition of the animals; in such cases medicinal treatment will be necessary. If the following lick be made available, it will not only be of great assistance in preventing serious invasion, but in cases where worms are not in large numbers, the repulsion of them from the intestinal tract will result:—

*Lick.*

20 parts salt.
10 do. lime.
1 do. sulphate of iron.

If possible be with mares at foaling, so that the navel cord may be properly tied and thoroughly treated with antiseptic, and thus prevent that very fatal disease, navel or joint ill. Wash cord with one part of corrosive sublimate to 3,000 of water, and soon after paint with tincture of iodine. The iodine treatment must continue till the cord has completely dried up.

CATTLE.—Cows should still be rugged, but coverings should be removed frequently, in order to enable the animal to get rid of the old coat; or, better still, a good curry-combing may be given. Continue hay or straw. Look up treatment for milk fever in *Journal of Agriculture, Nov.* 1922, and treat cattle accordingly. Give calves a good warm dry shed. Give the milk to young calves at blood heat. Have feeding troughs or buckets clean. Don't over-feed. Feed regularly with regard to quantity and time. Provide a good grass run, or fine hay or crushed oats in a box or trough. Give a cupful of limewater per calf per day in the milk. The problem with many at the present time is how to rear calves without milk. This can be done very well by starting them on new milk for a fortnight, and then gradually substituting the milk with one of the calf meals on the market. To these it would be advisable to add two or three tablespoonfuls of cod liver oil. The following meal is in general use in Ireland:—Two parts by weight, of oatmeal, 2 parts maize meal, 1 part pure ground linseed, all finely ground. Scald with boiling water, and allow to stand for twelve hours. Start with new milk, then gradually substitute skim and ¼ lb. daily of the meal mixture per head per day, gradually increasing to 1 lb. or more. In a month milk may be dispensed with altogether. The crushed oats, fed dry, have been found to give excellent results.

PIGS.—Supply plenty of bedding in warm well-ventilated sties. Keep sties clean and dry, and feeding troughs clean and wholesome. Sows may now be turned into grass run. Feed pigs a balanced ration in automatic feeder. Provide

plenty of charcoal and bone meal. If pigs are lousy dress with kerosene emulsion or sulphur and lard, rubbing well into crevices of skin, and disinfect sties. Worms are very prevalent at present, and may be treated by giving 2 to 10 grains of Santonin in form of pill, or from half to one teaspoonful of oil of turpentine in milk or castor oil.

SHEEP.—Late lambing in the wetter districts of the State should end with this month. Late lambs are usually the result of joining the rams as late as March; this should be confined to strong cross-breds and sheep with a predominance of English blood. Lambs dropped in August do well if the district be late or if there be available for them before they are weaned summer grasses and forage. In most places such feed can be grown only by means of irrigation.

In the early northern districts of the State preparation is now being made for shearing. Early shearing is advisable where it is intended to fatten quickly old ewes, early-dropped lambs and two-tooth wethers unsuitable for wool production.

The decision should now be made as to the breed and number of pure-bred rams required for the coming season. Place orders as soon as possible; breeders can then give satisfaction and allot preference to early applicants. Purchase rams from registered flock-owners. Breed and class should be given most careful consideration. Certain districts and pastures suit one breed or cross better than another. This knowledge can be gained only from the experience of others, or by trial after mature judgment by the sheep-farmer himself.

POULTRY.—Yards should be turned over with a spade or fork, and sown down with rape or barley. Keep the breeders busy—straw litter with a little grain scattered about will make them exercise. Overhaul incubators; see that the capsule of thermostat acts properly; thoroughly clean lamps, egg drawers, and chimneys. Test machine for two days before putting eggs in. It is also advisable to have thermometer tested. When additional incubators are required, it is more satisfactory to keep to the one make.

## CULTIVATION.

FARM.—Work land where necessary for summer crops. If required, roll or harrow crops. Plant very early potatoes in forward districts. Sow mangolds.

ORCHARD.—Complete planting and pruning of deciduous trees. Watch for peach aphis, and spray with tobacco solution, if present. Prepare for planting citrus trees. Spray for woolly aphis with lime sulphur or red oil spray.

FLOWER GARDEN.—Finish digging and pruning of roses, &c. Leave pruning of shrubs till after flowering. Keep weeds in check; weed out seed beds. Divide and plant out all herbaceous plants, such as phlox, delphiniums, rudbeckia, &c. Plant out gladioli. Complete planting of shrubs. Mulch young plants.

VEGETABLE GARDEN.—Top-dress asparagus beds; plant new asparagus plots. Plant herb divisions, and potatoes. Sow cabbage, cauliflower, peas, carrots, beans, radish, and lettuce seeds. Sow tomato seeds in a hot frame. Finish digging.

VINEYARD.—August is the best month for planting vines (grafted or ungrafted). This should be actively proceeded with and completed before end of month. Scions for field grafting may still be preserved as detailed last month, or better still by placing them in cool storage. They should all be removed from vines before middle of month, at latest. Conclude pruning and tie down rods. Preventive swabbing with acid iron sulphate solution of sultanas and other susceptible sorts, to control vine Black Spot, is emphatically urged. Though no damage was caused by this fungus last season, it showed itself in many localities. A showery spring would permit its rapid spread on untreated vines. Neglect of swabbing may spell disaster. A bulletin dealing with black spot and its treatment will be supplied on application. In some districts erinose will necessitate treatment. Swabbing and also spraying with lime-sulphur (1 in 12) at the close of winter are effective against this mite.

CELLAR.—Rack again, towards end of month (spring racking), wines which have as yet only been once racked. Fill up regularly all unfortified wines. Clean up generally in cellar and whitewash walls, woodwork, &c.

[illegible] MELBOURNE

*Most Nutritious Herbage Grown*

# SUBTERRANEAN CLOVER

(TRIFOLIUM SUBTERRANEUM)

(A Single Mat of Subterranean Clover)

## Can be grown with equal success on the Richest or Poorest Soils

**In many parts of Victoria, where the carrying capacity formerly was never known to exceed one sheep per acre, since sown with Western District Ryegrass and Subterranean Clover, is now carrying from four to five sheep per acre.**

## The Green Feed is a Succulent Nitrogenous Fodder

Greatly relished by all kinds of stock, which eat it in preference to natural grasses.
Has no equal for the general purposes of excellent feed, pertinacity of reproduction, supply of humus, and charging the soil with nitrogen.

**It is more economical and effective in providing humus and nitrogen to the soil than any other plant known to the scientific world.**

By its insinuating habit of growth, this Clover will prove an excellent medium for the suppression of weeds. It spreads into the thickest patches of noxious growths, and quickly becomes master of the situation.

### LEADING CHARACTERISTICS

1. Will grow on any class of land, high or low.
2. Once established, no need for further sowing.
3. Increases the carrying capacity of the land, and has an enriching effect on the soil.
4. Splendid for killing all weeds.
5. A very fattening herbage.

**Sow 15 lb. per acre if sown alone, or 4 lb. per acre when sown with other grasses**

Price: 4/- lb.; 3/10 lb. in 14-lb. lots; 3/9 lb. in 28-lb. lots
(Special Price for Large Quantities)

# LAW, SOMNER Pty. Ltd.

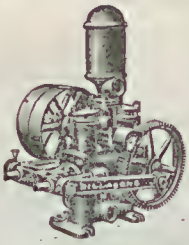
Established over 76 Years

**Seed Merchants and Nurserymen**
**Block Place & Swanston St., Melbourne**

*The leading Agricultural Seed House in Victoria*

Semi-Rotary Pump

# PUMPS



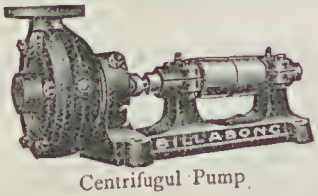
Double-Acting Piston Pump

WE have a wide range of Pumps and Pumping Machinery which are made in our Engineering Works at Melbourne and Sydney. Our very long experience in the manufacture of Pumps and Irrigation Plants has helped us in the designing and construction of Billabong Pumps. These Pumps are made specially to suit Australian conditions.

Hydraulic Ram

**Always get Billabong Pumps—Billabong Pumps are the Best.**

**Get full particulars and Prices of the Pump you require—They will be sent Post Free.**




Centrifugul Pump

**BILLABONG**
**Semi-Rotary Pump**

**BILLABONG**
**Centrifugal Pump**

**BILLABONG**
**Double-Acting Piston Pump**

**BILLABONG**
**Low-Down Pump**

**BILLABONG**
**Hydraulic Ram**

**BILLABONG**
**Cistern Pump**

Low-Down Pump

JOHN DANKS & SONS PTY. LTD.

# DANKS

391-403 BOURKE STREET - - MELBOURNE
324-330 PITT STREET - - - SYDNEY

Cistern Pump

THE STATE SAVINGS BANK OF VICTORIA

# CREDIT FONCIER LOANS

## ON FARM PROPERTIES

Up to two-thirds of valuation in sums from £50 to £2,000, repayable by instalments spread over 27½ years.

**Interest 6 per cent.**

**Special Terms for Discharged Soldiers and Dependants,** also those who were in the **Red Cross** and **Transport Services,** up to three-fourths of valuation, repayable by instalments spread over 30¼ years.

**Interest 5¾ per cent.**

NO CHARGE FOR MORTGAGE DEED

Application forms at any Branch of the State Savings Bank or by writing to the General Manager.

**Head Office:**
**139-149 Elizabeth Street, Melbourne.**

**GEO. E. EMERY,**
**General Manager.**

DEPARTMENT OF AGRICULTURE

# POULTRY FOR SETTLERS

**Orders for Cockerels for delivery from March may now be booked from the Poultry Pens at the Central Research Farm, Werribee**
**Settings of Eggs can be supplied in season**
**1st July to 1st October orders are booked in rotation**

### WHITE LEGHORNS

No. 1—Pure Cosh World's Record Strain.
„ 2—From Single Tested Hens with scores of 260 to 285 eggs, Single Mated to Cocks bred from Hens with scores of 275 to 301 eggs.

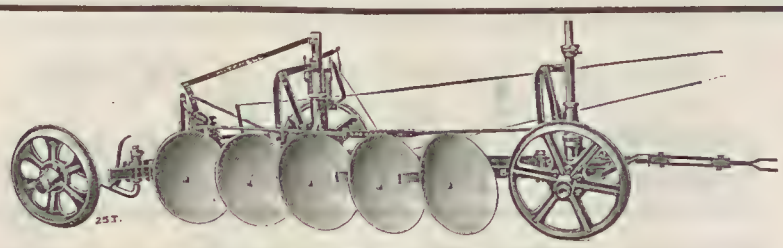
### UTILITY BLACK ORPINGTONS
**(Founded on Christie and Cullen Strains)**

No. 1—From Single Tested Hens with scores of 256 to 284 mated to Cockerels bred from Hens with scores of 272 to 313 eggs.
„ 2—From Hens bred from above mated to Cockerels bred from Single Matings.

### RHODE ISLAND REDS
**Pure Dalrymple**

From Hens with scores of 250 to 275 eggs, mated to Cockerels bred from Hens with scores of 264 to 292 eggs in 12 months.

**For prices and particulars apply to The Manager, Research Farm, Werribee**



MOULDBOARD OR DISC—2 TO 7 FURROWS.

# MITCHELL TRACTOR PLOWS

are the only ones in the world that are **wholly** operated by a pull on a rope from the seat of tractor while plowing.

Easy to operate—No levers. A pull on a rope lets plow in; a pull on another adjusts the depth **while plowing.**

**No stopping!—No bogging!**—because you can alter the depth **IN AN INSTANT.**

Can be horse-drawn, and later changed to tractor.

*WRITE. MENTION THIS ADVT. EASY TERMS.*

# MITCHELL & Co. Ppy. Ltd.

**Head Office: W. Footscray.** **Showroom: 596 Bourke St., Melbourne.**
**New South Wales Branch: Parkes.**

# *Profit by Dry Pickling*

WITH

# "ANTI-BUNT"

**(Finely Powdered Copper Carbonate 95/100% Purity)**

**For the Treatment of Wheat to Prevent Bunt or Smut.**

1½ ozs. of ANTI-BUNT will treat 1 bushel of seed grain

Complies with the Standard as recommended by the University of California and Departments of Agriculture.

**ANALYSIS GUARANTEED**

Copper as Cu 51/54%, Copper Carbonate and Copper Hydrate not less than 90% of a mixture of the two.

**FINENESS GUARANTEED**

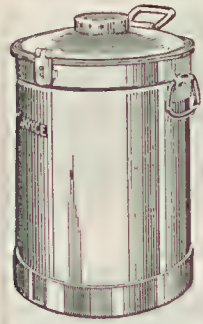
ANTI-BUNT will pass through a 200 mesh sieve.

| | | | |
|---|---|---|---|
| Kegs containing 56 lbs. | .. | 1s. 8d. per lb. | Net F.O.R. Melbourne |
| Cases ,, 2 x 20 lb. tins | .. | 1s. 9d. ,, ,, | |
| Cases ,, 4 x 10 lb. tins | .. | 1s. 10d. ,, ,, | |
| Cases ,, 8 x 5 lb. tins | .. | 2s. ,, ,, | |

*Samples and Supplies forwarded on Application to the Manufacturers—*

# A. VICTOR LEGGO & CO.

**Melbourne:** 497 Collins Street
**Sydney:** 9 Phillip Street
**Brisbane:** Market Street



# "JOYCE" DAIRY CANS

## ENTIRELY SEAMLESS

| MILK CANS | | CREAM CANS | |
|---|---|---|---|
| 20 Quart .. .. | 24/- | 3 Gallon .. .. | 21/6 |
| 24 ,, .. .. | 26/- | 5 ,, .. .. | 23/- |
| 30 ,, .. .. | 28/- | 8 ,, .. .. | 29/6 |
| 40 ,, .. .. | 32/- | 10 ,, .. .. | 31/- |
| 50 ,, .. .. | 35/- | | |

Name plates free, and freight paid per goods to nearest station in Victoria.

## "JOYCE" Milk Coolers for the farm

No. 1— 90 Gal., 12" x 24", £7 complete.
No. 2—160 ,, 18" x 27", £8 ,,
No. 3—220 ,, 20" x 30", £9 ,,

A complete cooler consists of cooler, strainer, vat and tap, galvanized brackets, unions and hose.

## "JOYCE" Separator. It sells because it excels!

Perfect skimming, easy running, simple and strong construction.
Sizes from 10 to 115 gallon. Cash or easy terms.

## "JOYCE" Products for SATISFACTION

*Obtainable from Butter Factories, Stores, &c., or Manufacturers—*

## A. JOYCE & Co. Pty. Ltd.

595-597 ELIZABETH ST. MELBOURNE.

# New Zealand Loan & Mercantile Agency Co. Ltd.

COLLINS STREET, MELBOURNE

## LIBERAL CASH ADVANCES

WOOL, GRAIN, SKINS, HIDES, TALLOW, BARK, STOCK AND STATION AGENTS ON COMMISSION ONLY

LOCAL SALES AND SHIPMENTS OF BUTTER UNDERTAKEN ON OWNER'S ACCOUNT

*Agents for*

PAGE'S WIRE STRAINERS IRONSIDE WIRE CUTTERS
BAILEY'S ANTI-MAMMITIS LOTION
FATERINE, A NATURAL CALF AND PIG FOOD

## COOPER'S SHEEP DIP

COOPER'S MILK OIL FLUID
WEEDICIDE MEDICO
COOPER'S WORM TABLETS
COOPER'S LAVENE

# SALES OF SHEEP & CATTLE

**Held Weekly at Newmarket**

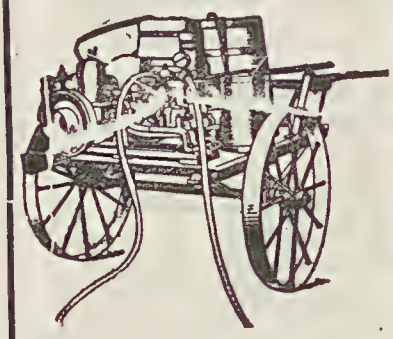
# LILYDALE LIME For the LAND

Farmers who have not used **Burnt Lime** should try it. The action of Burnt Lime on the land is **Immediate.** Farmers have the opportunity of obtaining the **well-known Lilydale Agricultural Lime.**

ANALYSIS—98% Calcium Oxide.

Apply—
DAVID MITCHELL ESTATE,
Sole Proprietors.

Head Office:
OLIVER'S LANE, MELBOURNE
Tel. Central 5725 and 5726.



"BAVE-U"
## Spraying Machinery
*FOR ALL PURPOSES*
Orchard, Vineyard, Station and Farm

**RUSSELL & CO.**
MANUFACTURERS
BOX HILL —— MELBOURNE

# BRUNNING BEST FOR BEARING FRUIT TREES

PRODUCING CROPS OF QUALITY FRUIT IN EVERY ORCHARDING DISTRICT OF AUSTRALASIA.

*Write for Free Catalogue of General Nursery Lines.*

**All Fruit Trees True to Name, and Healthy.**

**JOHN BRUNNING & SONS,**
Established over 50 years.
Somerville Nurseries,
SOMERVILLE, VICTORIA

# Australian "ESA" Bluestone

APPROXIMATE ANALYSIS 99·15% COPPER SULPHATE.

FOR SPRAYING, PICKLING, BATTERY PURPOSES, ETC.

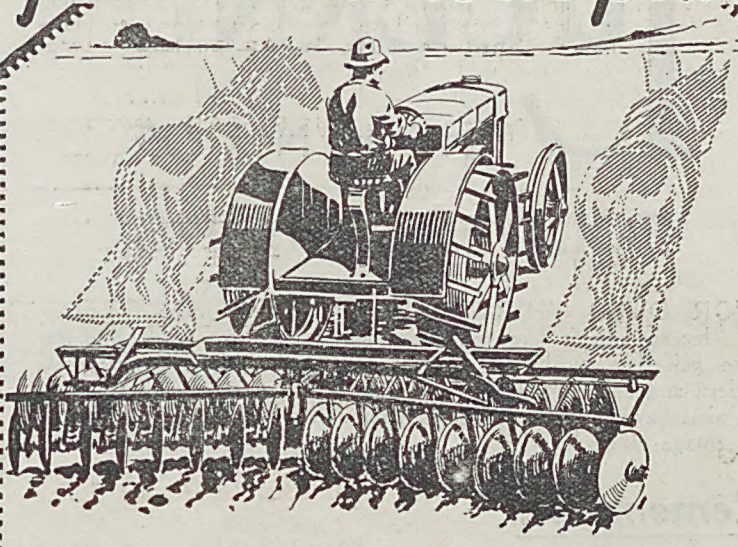
If your Storekeeper has no Stocks, Send your Inquiries to:—

**ELDER, SMITH & CO., LIMITED,** SOLE AGENTS

ADELAIDE: 27-31 Currie Street.
MELBOURNE: 95-97 William Street.
SYDNEY: 4 Bridge Street.
BRISBANE: 334-338 Queen Street.
PERTH: St. George's Terrace.

—— WRITE FOR DESCRIPTIVE PAMPHLET ——

# Gives Extra Horse-power



CROSS is not an illuminating kerosene, but a POWER fuel, specially proportioned for use in Tractors.

Being a highly refined engine fuel, Cross provides complete combustion, which means increased power and low fuel consumption.

Your Tractor will develop maximum pulling power and maintain its highest efficiency when regularly run on

In conjunction with Cross Kerosene, use

SHELL TRACTOR OIL - B -

a new, perfected Tractor Oil that successfully resists crankcase dilution, and ensures perfect lubrication with minimum carbon deposit.

**CROSS** *Power* **KEROSENE**

CROSS

CK16

THE BRITISH IMPERIAL OIL CO. LTD.

DISTRIBUTORS THROUGHOUT AUSTRALIA & NEW ZEALAND.

# LUCERNE

## THE KING OF FODDER · CROPS

FOR OVER THIRTY YEARS we have been handling lucerne seed in large quantities, and it follows naturally that we have gained a wealth of experience. We have built up a most modern and efficient cleaning and testing plant, and from the start our aims have been excellence of strain, purity of sample, and high percentage of germination.

***Remember !***

When you are sowing lucerne that it is a crop which is going to live and yield you returns for a number of years. Is it not then good policy to use a really good strain of pure seed ?

**YATES' BROADLEAF A·Y GIANT-UPRIGHT LUCERNE**

**Certified**
Australian Grown.

**Certified**
no trace of Dodder found when examined by experts.

**Statement**
of Purity and Growth with every bag.

**Packed**
in 25-lb. & 50-lb. net SEALED & BRANDED BAGS.

*Write for Current Price List (and samples, if required)*

We make delivery f.o.b. Sydney at prices quoted in our current list, and we pay freight and charges to rail Melbourne.

## ARTHUR YATES & Co. Ltd.

**Letters** Box 2707C G.P.O.

*Australia's Greatest Seed House,* 184-6 SUSSEX ST., SYDNEY

**Wires** "SEEDSMAN," SYDNEY


By Authority: H. J. GREEN, Government Printer, Melbourne.

# DEPARTMENT OF AGRICULTURE

# GOVERNMENT COOL STORES

## VICTORIA DOCK

**Facilities** are provided for producers and smaller exporters of the various kinds of produce, so that direct shipments on their own account may be undertaken. The Government ownership and conduct of Cool Stores places producers in an independent position, and, in addition, preserves an open channel for the carrying on of the export trade in perishable products.

**The Department of Agriculture** will receive, handle, freeze, store, and ship **Butter, Cheese, Eggs, Fruit, Meat, Poultry, Rabbits and Hares, &c.,** for producers and exporters.

**Produce** to the value of over **£30,000,000** has been treated at the **Government Cool Stores.**

**GOVERNMENT COOL STORES, VICTORIA DOCK (Dudley St.)**

**Telephones:**

**Office: 10383 Central.** **Superintendent and Engineer-in-Charge. 10382 Central.**

**SCALE OF CHARGES, ETC.**

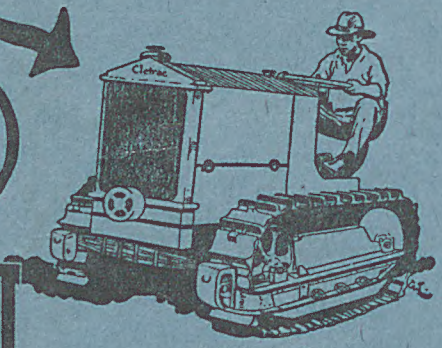
*and further particulars may be obtained upon application to the*

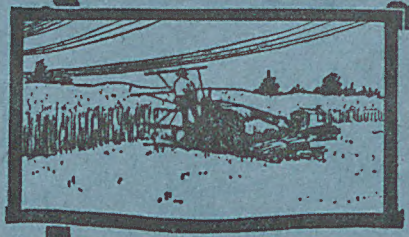
EXPORTS SUPERINTENDENT, DEPARTMENT OF AGRICULTURE, PRODUCE OFFICES, 605-7 FLINDERS STREET, MELBOURNE.

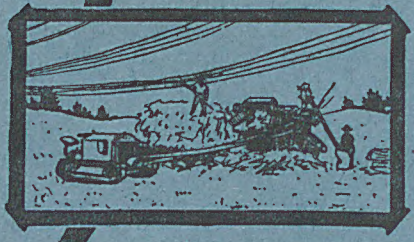
**Telephone 9380 Central.**

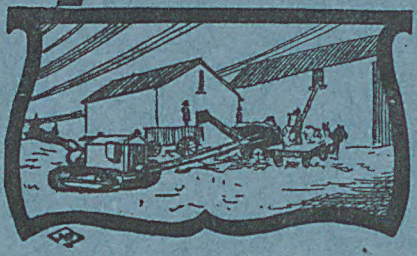
# Harvest With a

**Cletrac**
REG. U.S. PAT. OFF.







## TANK TYPE TRACTOR

## Be Prepared

The wise Farmer is the one who purchases his "Cletrac" NOW. By so doing he will ensure early delivery, and will have plenty of time to get familiar with it before harvest.

The "Cletrac" can be driven from the seat of your Harvesting Machine, for it can be fitted with a thoroughly efficient

## ONE MAN CONTROL

No matter what condition the crop is in, heavy or light, "Cletrac," being a one-gear governed machine, can be set to suit Every Requirement.

*Pictorial Literature Post Free.*

## TRACTION AUSTRALIA

PTY. LIMITED.

469 Flinders St. - MELBOURNE
383 Sussex St. - - SYDNEY

SP
630.
V645